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The Payment of Engineers

Some Doubtful Comparisons

MUCH excitement has been aroused lately by the introduction of the new scale of salaries for chief engineers of electricity supply undertakings. From the straightforward approach the discussions seem to be petering out although there are occasional recrudescences such as that at Woolwich where there was some disturbance because the Council was persuaded to re-advertise the borough electrical engineer's position after seeking to obtain a successor to the late Mr. F. F. Elliott at a salary lower than the scale figure.

But there have been two somewhat unexpected repercussions which give the matter a broader significance. In the first instance a gas engineer has written to his Institution (his letter is summarised in this issue) asking it to take steps to save its members from being put into an inferior position to their electrical "opposite numbers" employed by the same authority.

The writer raises a very ticklish point—whether an electrical engineer should be considered superior to a gas engineer. Or, put in a better way, whether the electrical engineer's job involves so much more training knowledge and responsibility that he is entitled to higher remuneration. Few will deny that his work is far more complicated than that of the gas engineer and naturally all electrical engineers will think that the answer is obvious.

Much will depend of course upon the relative sizes of the two undertakings—but what is size? The most promising basis of comparison would seem to be the thermal outputs, but would not this operate to the unfair advantage of the gas engineer? We have an idea that it is inherently a more formidable task to put out, say, 29 kWh than a therm of gas, on the assumption, decidedly flattering to gas, that they are equally efficient in utilisation. But we suppose the gas engineer, from his not unnaturally biased point of view, might consider this to be a proof of the superiority of gas rather than a reason for paying the electrical engineer more.

Let us turn, however, to another aspect, one which was raised by Mr. W. Andrews in our "Correspondence" section last week. He also thinks that too much is being paid to chiefs of electricity supply undertakings; in fact the chiefs themselves (and those on the road to chief's positions) seem to be the only ones who can see the justice of their cause. Mr. Andrews' case is that electrical engineers employed as designers and estimators by manufacturing concerns have as much (and sometimes more) training and ability and yet are paid salaries which are very meagre in comparison with those of chiefs of supply undertakings.

We doubt whether the comparison is so simple as this. Mr. Andrews looks on the chiefs as merely plant operators (the "merely" is not meant to be derogatory). The truth, of course, is that they are in addition managers of commercial undertakings: the generation of electricity is only the beginning of their responsibilities.

This fact does not excuse any underpayment of electrical engineers in the manufacturing industry—but that is another story.

Staff Men's Salaries

WE have already reported that in the case of the Worthing Corporation undertaking it was ruled that the Conditions of Employment Order was applicable to the electricity supply industry which meant, in effect, that the schedule of the National Joint Board of Employers and Members of Staff was recognised as the accepted " yardstick " for the payment of power station engineers. To secure adoption of the schedule by non-participating authorities another method of approach has been adopted by the Electrical Power Engineers Association, *i.e.*, by way of the Essential Work Order. The General Secretary has recently written to the Ministry of Labour giving a list of those undertakings who are not parties to the District and National Joint Boards and are not conforming to the agreed rates " so that the Minister can decide whether these undertakings can properly continue to be scheduled [under the Order] after the provisional period has expired."

Compulsory Registration

ALTHOUGH the National Committee on Statutory Wiring Regulations and Registration has prepared the schemes for which it was established, those schemes, in draft form, are still under consideration by the organisations represented on the Committee. There has been premature disclosure of some details of the proposals which the Committee deprecates. It has sent us a general memorandum on the scheme and we hope to be able to publish fuller particulars when all who have a right to be heard have had their say and any necessary amendments have been made.

Export Restrictions

EARLY in the war the Board of Trade instituted a system of export control to ensure that equipment urgently needed here was not sent out of the country. Electric generators, transformers and switchgear were the most important electrical items, but they were subsequently removed from the control list. As materials had to be devoted more and more to purely war purposes further classes were added and now the arrangements with the United States under the Lease-Lend agreement have made it necessary to include further important classes in the list; these are referred to in this issue. Among the more important items are conduits, installation materials and domestic appliances in which metal is the chief constituent. Formerly only a limited number of electrical instruments were controlled, but the latest Order applies to all indicating, measuring and recording instruments.

Measurement

IF a science crystallises from an art when results can be quantitatively ascertained with accuracy, scientific progress owes much to electricity. Beginning with meters for indicating electrical performance, evolution has been in the direction of devising electrical instruments for assessing values in quite extraneous processes. The point of greatest topical significance in the chairman's address to the I.E.E. Meter and Instrument Section last Friday was the reference made by Mr. W. Phillips to the use of " glass " as a (possibly improved) substitute for jewels in bearings. While many details may not be published at the moment we can say that the success achieved is to be attributed to collaboration not only between manufacturers, but also between manufacturers and users, which we hope will continue after the war.

The Late Mr. F. Pick

MR. FRANK PICK, who died last week, was one of the fortunate few who, like Sir Christopher Wren, built their monuments during their lives and need no " storied urn or animated bust " to perpetuate their memories. Together with Lord Ashfield he had been responsible for about thirty-four years for the building-up and co-ordination of the greatest urban passenger transport system in the world. But he was more than a very capable business man and transport operator; he strove to implant beauty and taste into the undertakings in his charge. He was an honorary member of the Royal Institute of British Architects and was prominently connected with the promotion of good design in industry. His influence was apparent in the buildings of the Underground system and particularly in the stations which, inherently of a tomb-like nature, have been made bright, tasteful and attractive. London has much to thank him for.

Restoring Supply

Measures Taken After Air-raid Damage

IMMEDIATELY after a raid the high-voltage systems must obviously receive the first attention. It is probably not necessary to inspect each substation, a visit to alternate ones on the line being sufficient to trace faults. Supplies are then restored to priority consumers, about which we shall have more to say later. Important cables near which "incidents" have occurred should then be inspected and it is also desirable to examine and test fuses controlling h.v. feeders. Cases have arisen where supplies to certain areas have been affected and consumers have evidently assumed that this is a normal condition arising out of the raid and have therefore made no complaint. In other instances interruption of telephone communications, etc., have prevented the authority being informed of failures of supplies. In both events consumers have been unnecessarily without electricity for considerable periods.

Last week we dealt with some of the air-raid damage experienced by electricity supply undertakings. We now describe the steps taken by engineers in badly affected areas in dealing with this damage

Some difference of opinion appears to exist regarding the pressure testing of cable under war conditions. Some undertakings say that it is not generally considered practicable or sound policy to carry out these tests while others think they are more than ever desirable. One undertaking in advocating pressure testing, points out that cases have arisen where cables, which have been subjected to strain by bomb explosion, have broken down on pressure test after detailed examinations have failed to show anything amiss. Where possible, too, it is suggested that pressure tests should be continued at frequent intervals for a considerable period on cables suspected of damage. While on the subject of tracing faults it is worth mentioning as a warning to repair squads that a case has been reported where an 11-kV cable has remained alive after being broken, the circuit-breaker not having operated.

Incidentally, while it is essential to restore supplies as soon as possible, this does not mean that personnel should take unnecessary risks or attempt to perform feats of endurance beyond their powers. Trained electrical engineers are scarce and it is foolish for them to risk their lives by going out when a raid is in progress unless it is absolutely necessary (some engineers say *at all*). This applies particularly to men fully trained in the layout of networks. It is a mistake to rush every available man to the scene of the damage and to have too many men at the same spot where one bomb might put them all out of action.

Moreover, it is bad policy, at any rate in districts where raids are likely to be frequent, to call all men out to work *after* a heavy raid. Where there is a large amount of damage to clear up it is much better to let the personnel get their proper periods of rest and so have relays of fresh men available throughout the twenty-four hours. The same, of course, applies to the Fire Service and other Civil Defence workers. Many engineers do not agree with this, but we nearly always find that they have not experienced raids night after night.

Damaged e.h.v. and l.v. cables in a water-filled bomb crater

The organisation of personnel for dealing with air-raid damage is largely a matter for each individual undertaking to arrange for itself to meet its own requirements, and several schemes have been explained to us, all with their own advantages and disadvantages. To give one example, under a scheme which appears to be working most satisfactorily in one large area: a mains emergency staff is continuously on duty and during the daytime, from 6 a.m. to 6 p.m., it consists of an engineer, jointer, jointer's mate, and an emergency van driver, while at night the staff is doubled. The remainder of the mains personnel is divided into stand-by sections each consisting of a senior engineer, assistant engineer, foreman leading jointer, jointers and jointers' mates. One or other of these stand-by sections is always on "first emergency call" at home during non-working hours. All engineers are on the telephone and transport arrangements have been made whereby the remaining personnel on each standby section can be brought out at short notice. All the remainder of the mains department is on "second emergency call."

When a raid occurs during working hours and the damage is slight the supply is restored and, if necessary, emergency repairs are carried out by the emergency staff in conjunction with the control engineer. Permanent repairs are then handed over to the appropriate district engineer. The normal work of the department is thus interfered with as little as possible. If the damage is extensive a senior engineer arranges the programme for the restoration of supply. Should a raid occur during non-working hours supply is restored and any minor damage dealt with by the mains emergency staff in conjunction with the control engineer. In the event of extensive damage the former calls out the stand-by section of the first emergency call and the senior engineer of the section makes the necessary arrangements for the restoration of supply, repairs, etc. Only in exceptional cases is the remainder of the mains staff called out.

After severe raids much valuable assistance has been rendered unstintedly by the staffs of neighbouring undertakings under schemes of mutual help, but the extent of this assistance is limited to a large extent by the amount of skilled supervision available. In a spirit of self-reliance (somewhat misplaced in the circumstances, we feel) some undertakings have refrained from calling in outside help and have taken it as a matter of pride to handle their own difficulties. During the first week of the bombing every available man from the generating, installation, cooker workshop and stores departments of one London undertaking was employed in excavating for cable runs.

One of the difficulties facing men repairing services is the location of the mains. When the demolition party has been active "landmarks" such as party walls, etc., may have disappeared completely over a considerable area, and the layout plans of the wiring may prove valueless. (This, incidentally, draws attention to the serious problem which will face supply authorities after the war, namely, that in badly devastated areas many roads and accordingly the cables, will not be required where they were before.) Another complication is that it may be necessary to disconnect a large number of premises (we have heard of as many as thirty being affected) to supply one consumer. When we have inquired whether an undertaking is still legally bound to supply such isolated premises, we have been told by the engineers that "we have never troubled to find out. So long as a consumer wants a supply we give it."

Repairs to cables being carried out in a bomb crater

One mitigating feature of the widespread bombing in some districts has been that it has assisted substantially in the change-over from DC to AC, it obviously not being advisable or economical to re-establish DC supplies where considerable damage has been done to sub-stations and mains.

Methods of dealing with l.v. cable faults depend on the nature of the bomb damage. If, for example, property is demolished and the service only affected, then the ground can be opened and the cable pot-ended, using either an iron box or a lead sleeve. The job is

permanent and the main distributor is not interfered with. If, however, property is demolished and the distributor is damaged or severed in a crater, a temporary quick repair is

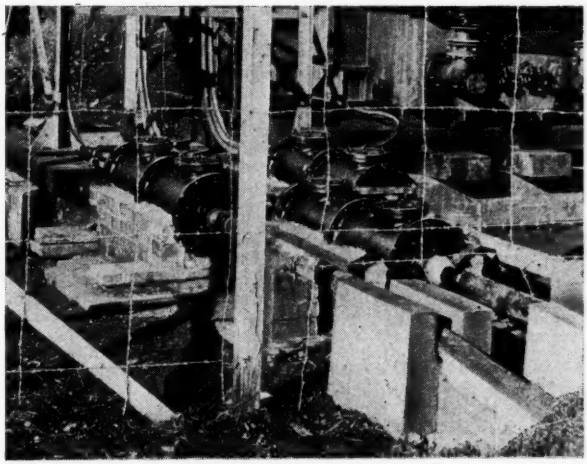
This substation, undamaged amid an area of general devastation, speaks well for modern construction

generally effected in order to restore the supply to adjacent property. This can be done by pot-ending the cable at each side of the crater, some undertakings using metal or wooden boxes made to their own designs, often in their own workshop. Usually these are sealed by filling in with pitch or cold-filling compound, though apparently the latter is not favoured by all engineers. The supply is then restored from either end.

Emergency supervoltage joints

Should the debris prevent access to the cable in the crater the cable is usually cut at a point remote from the crater and pot-ended in the same way. In making emergency repairs at craters the cables are often trenched in the road surface or slung on poles across the crater. In all cases of damage, the effect on the network has to be considered and where the network is a small section and a larger distributor feeds both sides of the fault, then the small distributor will normally be left permanently open at that particular point and a permanent pot-end made.

Although essentially an emergency arrangement a clever scheme for repairing cables in bomb craters, adopted by one undertaking only we believe, has the advantage of saving a great amount of time and trouble, and also of being permanent in character. Its only disadvantage so far as we can see is the use of a small extra amount of cable—an almost insignificant consideration in the circumstances. The idea is to drop a new section of distributor into the bottom of the crater, fill up around it with cement and make permanent joints at the ends. The repair gang is then free for another job, while any other services affected, gas, water, etc., are repaired. Then



when the work of "clearing up" the crater is nearly completed and before the road is resurfaced, an empty duct is laid in case a

failure of the new cable should occur at a later date, though there appears to be no reason why the cable should be any more susceptible to failure than one which has been laid in the ordinary way.

One of the greatest difficulties affecting cable repairs has been the presence of water. When floods occur after the whole cable has been severely shaken by bombing, any weak points in the cable system are likely to develop into faults. As will be appreciated, the job of repairing cables under flood conditions is arduous and much ingenuity has to be used. Usually it is necessary to make the joints a considerable distance from the crater. Mobile petrol-driven fire pumps are found to be of great value for this work as well as other pumping devices.

A Good Example

As an illustration of the ingenuity which has applied in carrying out repairs and effecting speedy restoration of supplies, the case may be mentioned in which all the high-voltage cables to two substations were affected. These cables were directly hit by high-explosive bombs. In order to restore supplies it was necessary to run temporary cables, and in view of other services involved, the temporary run had to be clear of the craters and had to cross a wide main road, which also had to be maintained open for traffic. The main road consisted of granite setts, laid on 9-in. concrete and as time could not be wasted in breaking up the wide main road, a novel type of cable run was involved for the five 0.2 sq. in. 6.6-kV cables that were required. About five rows of granite setts, 7 in. deep were removed and the concrete road beneath was left entirely undisturbed.

Wooden side rails (4 in. by 3 in.) were laid in the sides of the 7-in. trench, and other boards, 8 in. wide by 3 in. thick, of the same length as the trench width, were laid on top of the side rails, thus forming a wooden bridge for the five cables, the hole being flush with the road surface. The top boards were covered with earth and the main road traffic passed over this run for many weeks while the other authorities completed repairs to their services.

Perhaps even more effective is the method used by another undertaking faced with the same problem, namely the digging of the smallest possible trench, running armoured cable along it and filling in with solid cement.

Essential Services

In the restoration of supplies priority must, of course, be given to certain essential services. Which services are essential is a matter of opinion and may well be left in the hands of the local engineers who are in the best position to decide. Factories, hospitals, Post Office, catering establishments and in fact any premises connected with food, are rightly placed high upon the list by most engineers. The giving of these priorities after a raid in which the electricity available is restricted is simplified by marking the fuses of non-essential supplies in the substations. All that is then necessary after the damage has occurred is to send someone (not necessarily a skilled electrician) round to the substation to remove all the marked fuses.

The priority consumers, too, can be helped to play their part in securing quick restoration of supplies by providing them with a list of telephone numbers and addresses of officials and also a list of premises to which messages can be delivered for transmission to the appropriate control. During severe raids some undertakings have found it advisable to amplify this arrangement by publishing in the Press the addresses of officials in the various areas to which consumers of all classes have been invited to make their requests if they desire assistance. Incidentally, consumers in affected areas have shown a helpful co-operation in responding to appeals to restrict their supplies by not using radiators, etc.

After essential services have been restored some undertakings have established a sort of "flying squad" to visit damaged premises for the purpose of carrying out the necessary first aid, reconnections, disconnections and insulation testing to enable supplies to be used at the earliest possible moment in damaged premises or portions of damaged premises.

Sustained Overloads

Some undertakings in districts in which the gasworks has been put out of action have had to face sudden enormous increases in demand. We have been told of a case in which an 0.15 in. cable carried 280 A for three hours, with one two-hours' burst of 315 A. Though the reduction in loading due to premises being abandoned has assisted in keeping the load on certain cables within a safe limit, the load often needs to be kept under constant supervision. Following a raid it may be necessary, for instance, if the load becomes too high, to switch out certain sections of the network altogether or to transfer them from one feeder to another.

Dealing with tramway undertakings it is very essential that before the trolley system is energised great care should be taken to make sure that the negative rail feeds are not severed, otherwise there is a grave risk of raising the rail potential.

A vital aspect of repair work is the provision of ample stores and it is imperative that stocks of any particular material should not all be kept in one place. Emergency stocks of cable, cable boxes, etc., should be distributed over as many depots as possible with as much as possible in each depot, this applies particularly to cable drums. Switchgear and spare transformers, cookers, washboilers, meters and materials of a non-inflammable nature can

conveniently be distributed at static substations, drums of cable being placed on the small amount of land which usually surrounds the buildings.

Stocks of cable covers awaiting use can be placed to form an additional blast protection for substations. The storing of complete cable jointers' kits in substations is also sound practice. In large undertakings the segregation of motor vehicles assumes considerable importance.

One undertaking estimates that a half of 1 per cent. of the amount in use, say, a normal five weeks' requirements, should prove sufficient for an emergency stock of cables, which in view of the difficult conditions likely to prevail when repairs are being carried out should be armoured whenever this is found possible.

Any cable used from a depot in a danger area should be minutely examined and if possible tested before use as cases have arisen in which cable stored on drums has been damaged by shell splinters, etc., and has broken down in service some time after laying. The same authority says that after a heavy raid a large number of straight joint boxes may be required and it suggests that it is desirable to carry a quantity of sheet lead which can be used for emergency boxes.

Referring to a suggestion that authorities should build up stocks of motors, switchgear, transformers, etc., for the use of large consumers, a Midland undertaking has come to the conclusion that the transformers are the key apparatus. If motors are damaged, it says, the plant they drive will most likely be put out of action, too, while if the consumers' switchgear is rendered useless the undertaking as a rule can, as an emergency measure, dispense with it altogether. But a transformer cannot be done without and as the result of a suggestion of the undertaking the local Chamber of Commerce has purchased a number of units of various capacities with fees collected, according to the capacity of the transformers installed, from consumers co-operating in the scheme.

With respect to the storage of records it is a wise precaution to have all the essential ones such as drawing office records and maps as well as meter records triplicated and kept in separate places. With the present depleted staffs this may sound rather a counsel of perfection, but if it can be done an enormous amount of trouble will be avoided should the record section be unlucky. Quite a few unfortunate undertakings will bear us out in this.

In conclusion we express our gratitude to all those engineers who have assisted us in the preparation of this and the earlier articles, by telling us of their experiences, as well as our admiration of the way in which they have maintained supply in the face of unprecedented difficulties.

Chief Engineers' Salaries

A Gas Man's Plaint

RECENT developments in connection with the salaries of chief engineers and managers of electricity supply undertakings have led a municipal gas engineer, Mr. J. A. Derbyshire of Gainsborough, to address a letter to the Institution of Gas Engineers on the subject. A copy was sent to the *Gas Times*, from which journal we quote it.

Mr. Derbyshire starts by alleging that the "Chief Electrical Engineers' Association" is taking advantage of the terms of the Essential Works Order to enforce upon local authorities the scale of salaries laid down by the Association. He thinks that local authorities will have no option in the matter and that the salaries will be adopted.

This leads him to suppose that gas engineers are likely to be placed in a much inferior position where electrical engineers are employed by the same authority, and he wants to know whether the Institution is taking any steps to place its members on a comparable basis with electrical engineers seeing that generally gasworks are also embraced in the registration.

He says that so far as his own town is concerned, the adoption of the scale will result in the electrical engineer becoming "the highest paid servant of the Council, not having by any means the greatest degree of responsibility." Mr. Derbyshire congratulates the electrical industry on its unity in demanding a scale of salaries, "as they are no doubt, as we in the gas industry are, looking ahead to the time of post-war reconstruction, but with this essential difference that whereas they can look forward to a remunerative and progressive salary, and by this I mean if you wish to call it such, payment by results, whilst the gas engineers employed by local authorities are definitely at the tender mercies of the Council."

He goes on to ask why, as both industries are purveyors of light, heat and power, the gas industry cannot do the same for its members. "If these scales of salaries are adopted by local authorities I can see that the electrical industry is going to be in a better position than ever in recruiting the best brains possible, with the added incentive that salaries are increased if kVA is increased, and whilst competition has been fierce in the past, we can anticipate still fiercer competition in the future."

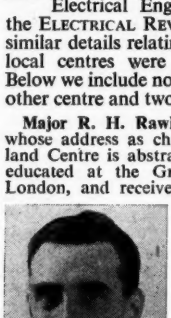
After a further appeal to the Institution to take steps in the matter, Mr. Derbyshire concludes: "It always appears to be what the electrical engineers do to-day the gas engineers do to-morrow."

I.E.E. Chairmen

Further Biographical Notes

BRIEF biographies of the President and section chairmen of the Institution of Electrical Engineers were published in the ELECTRICAL REVIEW of October 24th, and similar details relating to the chairmen of four local centres were given on October 10th. Below we include notes on the chairmen of one other centre and two sub-centres.

Major R. H. Rawll, M.I.Mech.E., M.I.E.E., whose address as chairman of the South Midland Centre is abstracted on another page, was educated at the Grocers' Company's School, London, and received his technical training at the Hackney Technical Engineering Institute and with Dick Kerr & Co., Ltd. During the last war he served as a sapper with the London Electrical Engineers, R.E. (T), subsequently obtaining a commission in the R.A.F. as observer and navigation officer.



Major R. H. Rawll

After a period of three years as pupil of the chief electrical engineer of the L. & N.W. Railway, he joined the Birmingham Electric Supply Department in 1922 as assistant district installation engineer. Since then he has held the position of district installation engineer, assistant frequency change engineer and frequency change engineer responsible for the change-over from 25 to 50 cycles. Upon the completion of this work in 1936 he was appointed to his present position of sales and development engineer.

Prior to the war he held a commission as major in the Royal Artillery, Territorial Army Reserve, commanding an anti-aircraft battery, and he was called up for service in August, 1939, returning to his civilian duties last year. He now holds a commission in the Home Guard with the rank of major, and is in command of the Birmingham Electric Supply Department company.

Since 1939 Major Rawll has been chairman of the Central England Area of E.D.A. and a member of its Council. He has been chairman of the Birmingham and District Section of the E.P.E.A. and a member of its National Executive Council. For several years he was a member of the staff side of No. 5 District Joint Board, and for three years was a member of the North-West Midlands J.E.A., representing the staff. In 1925 he was chairman of the Students' Section of the South Midland Centre of the Institution. He became hon. assistant secretary to the Centre in 1929 and took over the office of hon. secretary in 1937, relinquishing this position to become chairman.

Mr. F. C. Clarke, B.Sc., A.M.I.E.E., chairman of the Sheffield Sub-Centre, is Principal of the College of Technology and Art, Rotherham. He was foundation scholar at the Plymouth Corporation Grammar School, proceeding with a national scholarship to the Royal College of Science, London, where he was chairman of the College Union. He has filled the positions of assistant master at the Tavistock Grammar School, science master at the Plymouth Corporation Grammar School, demonstrator in physics at the Royal College of Science and Birkbeck College, and in electrical engineering at Chelsea Polytechnic. He was also formerly senior master of the Junior Engineering School, and chief lecturer in physics at the West Ham Municipal College. During the last war he served as a Territorial officer and retired with the rank of major; he holds the Territorial Decoration.

Mr. P. S. Wakefield, M.Sc.(Eng.), M.I.Mech.E., A.M.I.E.E., who is chairman of the East Midlands Sub-Centre for the 1941–42 session, was educated at Mountjoy School, Dublin, and Newtown School, Waterford. In 1913 he became an articled pupil with H. T. Hazzledine, Ltd., electrical contractors, Nottingham.

During the last war he saw active service in France and Belgium with the West Yorkshire Regiment and in May, 1919, was placed on the Special Reserve of Officers. In that year he resumed his studies at the Irish Royal College of Science, and at University College, London.

Mr. P. S. Wakefield

In 1923 he was appointed chief technical assistant to Mr. W. Chiltern, who was chief turbine designer and chief engineer of the Brush Electrical Engineering Co., Ltd., and since 1931 he has been chief turbine designer to the Brush Company with the responsibility for the design of Brush Ljungström double rotation steam turbines and associated condensing plant. He is a captain in the Leicester Home Guard.

Mr. Wakefield gave his chairman's address to the East Midlands Sub-Centre on October 15th, his subject being "The History and Development of the Radial Flow Steam Turbine."

Electrically Operated Bridge

THE Lord Mayor of Dublin (Ald. P. S. Doyle) recently opened a new bridge over the Royal Canal at Sheriff Street, Dublin. Although of a pattern familiar in Holland, it is the first of its kind in Ireland. It can be operated to the full lift in 75 seconds by electrical power. The plans were prepared by Mr. G. C. Murphy, chief engineer of the Great Southern Railways, in collaboration with Mr. N. A. Chance, city engineer, and Mr. J. Mallagh, engineer to the Port and Docks. The greater part of the cost (£18,000) has been met by the Corporation.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE new borough electrical engineer of Woolwich is to be **Mr. W. A. Gallon,** deputy borough electrical engineer at Southampton. Eight candidates were interviewed by the Borough Council General Purposes Committee, which selected three of them—Mr. Gallon, Mr. H. A. Pryce-Jones, deputy city electrical engineer, Liverpool, and Mr. H. C. Spence, deputy borough electrical engineer at Croydon—for further consideration. The salary is in accordance with the terms and conditions of the agreement of the National Joint Committee. The present salary is £1,768 per annum, rising to £1,924 in the second year and £2,080 in the third.

We briefly reported in our last issue that **Mr. C. D. Taite,** M.I.E.E., had been appointed managing director of the Lancashire Electric Power Co. Since January, 1907, he has been engineer and manager of the company, and was appointed a director of both the Lancashire Electric Power Co. and the Lancashire Electric Light & Power Co., Ltd., in 1931. He is also a director of the Ormskirk Electric Supply Co., Ltd.

Mr. C. D. Taite

Mr. Taite is a member of the National Joint Industrial Council for the Electricity Supply Industry and of the National Joint Board of Employers and Staff Members for the Electricity Supply Industry. He is chairman of the National Consultative Committee of the Central Electricity Board, a past-chairman of E.D.A. Council and a past-president of the Incorporated Association of Electric Power Companies.

Mr. G. H. Byron has been appointed lamp superintendent for the Metropolitan-Vickers Electrical Co., Ltd., in Birmingham, in succession to Mr. G. C. Gray, lately deceased. Before joining Metropolitan-Vickers five and a-half years ago, Mr. Byron was on the sales staff of Philips Lamps, Ltd., Birmingham, for approximately ten years, and previous to this was with the General Electric Co., Ltd., at Birmingham for a number of years.

Mr. S. C. Harling, mains superintendent with the Harrogate Electricity Department, was presented with a clock and fountain pen set on leaving to take up his new appointment as deputy electrical engineer at Chester. Mr. A. Kelso, the borough electrical engineer and manager, made the presentation.

Sir Franklin Sibly, D.Sc., LL.D., has been appointed a member of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research. **Viscount Falmouth** has retired from the Council on completion of his term of office.

We reported last week that **Mr. R. A. S. Thwaites** had been appointed assistant deputy electrical engineer to the Manchester Corporation. We learn, however, that although the appointment has been confirmed by the Corporation General Purposes Committee it has yet to come before the City Council which meets on December 3rd.

Mr. F. E. O'Kelly, B.E., B.Sc., formerly chief assistant engineer in the operations department of the Eireann Electricity Supply Board, is one of the directors of the Mineral Exploration and Development Co. established by the Irish Government to carry out the activities indicated by its title.

Mr. A. T. Rogers, mains superintendent to the Leicester City Electricity Department, though having reached superannuation age, is to retain his present position.

Mr. W. Bennett, of the Wallasey Electricity Department, has been appointed chief clerk to the Dewsbury Electricity Department.

Mr. G. R. Auchterlonie, of Shrewsbury, has been appointed distribution engineer to the West Bromwich Corporation Electricity Department at a salary of £546 per annum.

Mr. J. J. Hinde, mains assistant in the Mansfield Electricity Department, has resigned.

Lt.-Commdr. Haydn T. Harrison, M.I.E.E., R.N.V.R. (Ret.), has moved to " Pivington," 138, Old Dover Road, Canterbury, Kent.

Mr. R. A. Watson Watt, F.R.S., has been elected president of the Association of Scientific Workers in succession to Professor F. G. Donnan, C.B.E., F.R.S.,

Mr. C. J. Bartley, principal of C. J. Bartley & Co., Ltd., the London and Derbyshire electrical engineers and contractors has just celebrated his golden wedding anniversary; he has also fifty years' service in the electrical industry to his credit. His two sons, Messrs. C. A. and E. A. Bartley, are co-directors of the company.

Mr. C. J. Bartley

Mr. G. D. Christie has resigned his position as general manager and secretary of Electrical Facilities, Ltd., having been appointed secretary of the Automatic Telephone & Electric Co., Ltd. On November 4th Sir Montague Hughman, chairman of Electrical Facilities, Ltd., presented Mr. Christie with a wireless set from the chairman and members of the staff.

Mr. M. S. Mason, A.M.I.E.E., engineer of Electrical Facilities, Ltd., has been appointed manager and engineer, and **Mr. R. J. Martin** has been appointed acting secretary of the company.

Sir Thomas Higham, who recently resigned the chairmanship of Accrington Electricity Committee after thirty-six years' service, has been elected to the committee by the Town Council.

Obituary

Mr. W. H. Mort.—We regret to report the death of Mr. W. H. Mort, assistant works manager of the Tudor Accumulator Co., Ltd. Mr. Mort, who was in his sixty-sixth year, joined the company in 1896 and was for many years its erection manager, during which time he was responsible for the erection of many of the larger power station batteries in this country and abroad. In 1910 he went to Rio de Janeiro to supervise the erection of a battery which the company supplied and which was believed to be the largest in the world, consisting of 276 cells having a capacity of over 21,000 Ah. He was particularly interested in the battery propelled electric vehicle and was responsible for the design and development of the company's traction battery.

Mr. F. Pick.—We learn with regret of the death, which occurred last week, of Mr. Frank Pick, who took a leading part for many years in the operation of London's vast passenger transport system. Mr. Pick was born at Spalding, Lincs., in 1878 and qualified as a solicitor in 1902. In the following year he joined the North Eastern Railway Co. under Sir George Gibb. When the latter proceeded to London in 1906 to manage the Metropolitan District & London Electric Railways Mr. Pick went with him and became a member of the staff of Mr. A. H. Stanley (now Lord Ashfield).

He was appointed traffic development officer in 1909 and twelve years later became joint assistant managing director of the Underground group of companies, rising to managing director in 1928. When the London Passenger Transport Board was established in 1933 Mr. Pick was appointed vice-chairman, a position which he held until his retirement last year.

Upon leaving the Board he was asked by the Minister of Transport to conduct an inquiry into the possibility of speeding up operations at British ports and was later for a few months director-general of the Ministry of Information.

Apart from his transport activities which absorbed practically all his time he was deeply interested in the subject of design in industry. He was for a time chairman of the Council for Art and Industry set up by the Board of Trade, and was an honorary member of the Royal Institute of British Architects.

Mr. W. N. Weston.—We regret to announce the death at his home in Loughborough on November 1st, of Mr. William Newton Weston, M.I.Mech.E., who was closely associated with Herbert Morris, Ltd., for over thirty years, and who for the last quarter of a century had been an active director of the company. He was chiefly concerned with the development and application of electric overhead cranes and many other kinds of power-operated lifting and handling gear.

Will.—**Mr. C. G. Lamb,** Reader Emeritus in Electrical Engineering, Cambridge, who left £6,278 (n.p. £6,162), bequeathed £500 to the University, upon trust for a "Charles Lamb Prize," to be awarded each year to the candidate in the Mechanical Sciences Tripos who shows the greatest proficiency in the subject of electrical engineering.

Wiring Rules and Registration

THE National Committee on Statutory Wiring Regulations and Registration decided at the beginning of hostilities to postpone any further work until after the war. In the summer of this year, however, it was felt that as several institutions and other bodies were giving consideration to post-war planning, development and reconstruction, it would be desirable that the Committee should prepare a scheme which it had in mind for ensuring satisfactory principles, workmanship and materials in electrical installations generally, and especially in connection with reconstruction. With this in view the Committee divided its work into the following parts:—

(1) To prepare a scheme for examining, licensing and registering contractors, operatives and others engaged on electrical installation work.
(2) To consider, and if thought desirable, to prepare a minimum safety code of wiring regulations.
(3) To consider, and if thought desirable, to prepare a scheme for proving houses or other means by which materials, apparatus and fittings could be tested to a given standard of safe use and operation.

One Association represented on the Committee approached the Minister of Works and Buildings, who replied to the effect that he was in consultation with the President of the Institution of Electrical Engineers, which he regarded as the most representative body and with which he hoped that it would be possible to arrange for such consultations as would cover all aspects of these very important questions.

The Committee thereafter met representatives of the Institution of Electrical Engineers and asked whether they would be prepared to consider proposals covered by the three headings given above. These representatives considered that their Council would always be prepared to examine such proposals although they could not, of course, at that stage be aware of what view would be taken. It was clear, however, that they would be especially interested in a condensed code of safety regulations for the electrical installation industry.

The Committee has prepared a scheme for examining, licensing, and registering all operatives engaged on electrical installation work, and this scheme is at present in draft form. It has been submitted to the various Associations represented on the Committee, and their criticisms are at present under consideration by the Committee. It is hoped that the final scheme on this subject as modified will be available to present to the I.E.E. and to the Press in the near future.

The Committee feels that it is a little unfortunate that two Associations have recently published in their journals some details of the draft scheme before it is finally corrected and approved. It thinks that this may tend to mislead that part of the electrical industry that is interested. The Committee hopes that the I.E.E. will be willing to prepare a condensed code of safety regulations and to consider also a scheme for providing that materials, etc., are up to a given standard. The recommendations of the Committee are that the three parts of their proposals referred to above should be made obligatory.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Gold from Sea Water

YEAR by year this subject is referred to in the technical Press; it appeared again in your issue of October 31st.

To approximate the date of my experiments I turned up my articles of apprenticeship and I think it was in 1893 that I met an Englishman who claimed to have a patent for extracting gold from the sea. We made this machine in a small works that I had in Birmingham and in due course set out with it to North Wales on the coast near Puffin Island, with visions of buying the island and putting a plant down there. However, after sitting in an open boat day after day, for what seemed at the time to be eternity, we had only extracted a few grains of gold. We did extract a white metal that I had analysed as silver and for many years after I kept samples of it. The figure you quote of £5 millions of dissolved gold per cubic mile of sea water is interesting and I wonder whether any similar comparison has been made for silver.

However, an electrolytic process which you briefly referred to in your issue of May 16th last under the heading of "Salvaging Burnt Plant" appears to be a much more interesting proposition than my early experiments. By applying much the same principles as in the earlier experiments parts of machinery or other metallic articles can be reclaimed almost as new and I thought it might be of interest to some of your readers to hear that since you referred to this process as used in one works, a company has been started to carry it out on a commercial basis.

London, E.C.2. CECIL D. FALCKE.

Maintenance Men

IN just a few weeks over the second year of war, I was forcibly reminded by your leaderette, "Factory Maintenance," of October 31st, that I am in my fourth post since war broke out. I, too, believed that with the setting up of new plant for the increased war effort men who knew how to install and, better still, how to maintain those plants and keep the machines turning over, would come into their own.

My first effort was with a firm who were turning out aircraft parts: ex-garden boys, etc., on a 47-hour week were paid twice as much for their work as I received for my 60-hour week. My next post was a repetition of the first only much more difficult: I came under the supervision of a youth in the twenties who was hardly master of his own job, let alone mine.

Then I went to a really large plant. There I found over thirty electrical men on maintenance under a chief engineer who before the war had been a publican for many years. In consequence the working conditions were of such a nature that I got into touch with the Ministry of Information through a newspaper reporter and they sent a C.I.D. man to interview me.

I have thirty years of practical and technical experience, mostly in America, and I held a Class A certificate in Canada. I have had supervisory jobs in this country and in electrical advertising have a very good name. I am simply astounded at the conditions I have found in the plants I have worked in, and, mark you, I have left them of my own free will and moved on, trying to find a post equal to my ability. At present I am cooling my heels in another post that could be taken care of by a decent improver.

I suppose there is nothing much one can do about it, but when you say such men are at a premium, I just cannot understand. Since war broke out my earning power is down fifty per cent.

Braywick, Berks. HARRY ROSE.

Need for Waste Paper

IN our last issue we urged upon our readers the vital necessity of clearing out all their waste paper for use in the production of munitions of war. Once again we ask them to give the matter their ernest attention, and to help them we give the following hints as to the disposal of the paper which they have collected.

Most local authorities of any size have organised collection arrangements and usually, therefore, the simplest way is to ask them to come and fetch the paper. An alternative method, if the quantity is large enough to warrant it, is to get into touch with an approved wastepaper merchant in the district. In case of difficulty we can supply the name of the nearest merchant.

The salvaged paper may include documents of a private and confidential nature, but there need be no qualms about that for approved waste-paper merchants will give a guarantee as to the handling and disposal of the matter. In exceptional cases it can usually be arranged that an official of the firm disposing of the waste can watch the documents being converted at the paper mills.

It should be noted that greasy paper should not be allowed to get into the bundles and it will assist in the sorting if newspapers, periodicals and white paper generally are kept separate from coloured paper and cardboard.

Remember that waste paper is an important munition of war. *Give it up now!*

After the Truce

Reorganisation of the Gas Industry

From a Correspondent

HAVING been on the defensive for a considerable time past, the gas industry has received additional blows due to the vulnerability of its storage and distribution plants in air warfare. However, in response to the general wave of post-war planning that sweeps the country, important discussions are taking place within the ranks of the gas industry and although the interest in the activities of the competitive camp has so far not been reciprocated by the electricity supply industry to the extent to which it is being practised by the gas industry, it might well be worth while for it to be kept apprised of the gas industry's intentions.

The post-war-reconstruction move of the gas industry was officially inaugurated by a symposium of papers on the theme "The Gas Industry: 1941 and After," presented at this year's annual meeting of the Institution of Gas Engineers. Some points of these papers and of the ensuing discussion are outlined in the following notes:—

The limited truce between the gas and electricity industries must not lead to neglect to prepare for the clashes of interests that are bound to arise after the war

There are at present about 700 gas undertakings in this country, 260 of which are small ones. About 10 per cent. of the total gas output is controlled by holding companies, only partly on a regional basis. The rest of the undertakings consist of independent units, very loosely organised in the British Gas Federation. The keynote of all the proposals put forward is a call for effective co-ordination of this multitude of individual units into large groups of a regional character or into a complete national unit, allowing centralisation of manufacture in large and economic gas-making units, linked up to ring-main distribution systems, preferably in co-operation with the coke-oven industry.

Voluntary Co-operation Favoured

This goal could be achieved by (i) complete amalgamation and grouping of the industry, possibly under Government sponsorship, (ii) extension of the holding company principle, or (iii) establishment of co-operative bodies on a semi-voluntary basis, enforcing adherence to their rules by "sanctions."

The alternative marked (iii) seems to be preferred by most of the contributors, but even there some of the ideas expressed go rather far; for instance, it is suggested that any undertaking wishing to extend its work or district should have to obtain permission from a central body advised by regional commissioners, who would also decide whether it would not be preferable to extend at one of the "selected" centres of production.

While it is appreciated that some sort of compulsion might be desirable, or even indispensable, the majority view seems to be in favour of reorganisation "from within" as opposed to "from without." It is felt that an additional incentive to act has arisen from Lord Reith's recent intimation of his ideas on "nationalising" the public utility industries, though not in the Socialist sense of being State owned. However, even the contributors advocating Government support in connection with the reorganisation all insist that the gas industry should first prepare the plans, and only then approach the Government.

A particularly noteworthy suggestion is that the construction of the trunk mains for the contemplated grids might rank among the Government schemes anticipated to be undertaken to provide employment for the difficult period after the war.

Some opposition views are also of interest; for instance, that "the gas industry requires rejuvenation and not amalgamation" or that "until a fuel policy is formed and the industries concerned know of their respective places therein, no rebuilding scheme in this country can be undertaken." This hints at the possible establishment of a Ministry of Fuel.

In general the present reorganisation plans of the gas industry are reminiscent of the position that prevailed at the corresponding period of the last war in respect of the electricity supply industry, which resulted in the setting up of various committees, and the ensuing electrical legislation. Concentration of production, regional commissioners, grid, selected centres, Government grants, etc., sound familiar to electrical engineers conversant with the history of electricity supply during the last few years. It seems that, although much the senior of the two competitors, the gas industry is somewhat belated in its endeavour to catch up with the electricity industry, at least in the field of organisation.

Post-war Expenditure

One cannot help feeling that when there is discussion about the future of the gas industry, particularly when it comes to the suggestion of investing huge amounts of capital in new gas grids, possibly with the use of public funds, it will have to be examined whether the

limited means that will be available had not be better used in completing the reorganisation of the electricity industry, for instance, by expediting the badly lagging conversion of the remaining DC systems to AC. Such far-reaching decisions necessitate, of course, comprehensive investigation from the point of view of what is best for the nation as a whole, and it cannot be denied that in such a weighing up of the advantages and disadvantages of the competing methods a certain role may be played by considerations as to home production of motor fuels.

Summarising, it would thus appear that the situation calls for an authoritative assessment of the comparative abilities and disabilities of raw coal, gas, and electricity in respect of the supply of domestic energy requirements, with the aim of formulating an all-embracing post-war policy.

INSTITUTION PROCEEDINGS

I.E.E. and the Community.

The Electrical Future

REFERENCES to post-war policy and the Committee of the I.E.E. recently set up to act as a clearing house for suggestions and proposals prefaced the inaugural address of Major R. H. Rawll as chairman of the South Midland Centre of the INSTITUTION OF ELECTRICAL ENGINEERS at Birmingham on October 25th.

Mr. Rawll considered that a legitimate grievance of many of the younger members would be removed if corporate associate membership could be granted to those who fulfilled the technical examination requirements and practical training qualifications without having, in addition, to occupy for a specified period an appointment involving a definite degree of responsibility, a stipulation which in the past had created a vicious circle. Full membership could be reserved for those who attained to a specified degree of professional responsibility.

The Institution and Politics

While purely party politics were rightly forbidden, it was useless to complain of the impotency of engineers relative to the mutilation or jettisoning by politicians of well thought out schemes designed to benefit the community and, at the same time, to refuse to allow discussion within their own professional institutions of the political aspects of engineering matters. The I.E.E. should take the lead in permitting such discussions, thereby enabling its members to become more fully informed of the political implications of numerous electrical matters that would affect national life in the post-war period. It was the commercial application of scientific developments which was of most use and interest to the average member in his professional life; the dividing line between economics and politics was nowadays very narrow, if at all discernible. The true perspective of any engineering project could not be obtained without viewing it equally from all standpoints.

The absence of any single accepted body which could truly be said to represent electrical engineering views, not merely technical but in a wider economic and political sense, greatly handicapped the putting of those views before those in authority concerning matters affecting the community as a whole. To be effective, representation must often be prompt and in this case the I.E.E. might also take the lead by widening its functions in anticipation of the numerous post-war issues that would undoubtedly affect the profession. To make any such effort embrace all branches of engineering would be impracticable, as it would become administratively too cumbersome to be effective. Let the electrical house be put in order first, before venturing further afield. The I.E.E. must not merely adapt itself to changing conditions, but in many respects must actually go ahead of them.

Wartime Wiring Practice.

The Supply Engineer

Turning to his own branch of the profession, Major Rawll offered a few observations on the characteristics of supply engineers, whose main concern nowadays was distribution rather than generation; they were not only producers, but also sold their commodity, so that commercial management occupied a good deal of their time. The war had provided an opportunity of reviewing past sales methods and policies, as well as of avoiding uneconomical facilities.

While they were playing a great part in social development and betterment, tradition affected them more than they imagined; in turn, their own present prejudices and views must necessarily affect the professional make-up of future electrical engineers. Thus they had the moral responsibility of indicating to their successors any particular faculties which they should strive usefully to develop in the careers that lay before them. For example, Major Rawll suggested that the employment by supply engineers of a little more imagination would not be amiss.

Much more attention would need to be paid to properly training young men entering the supply section of the industry, the ramifications of which had become so vast, with specialised problems peculiar to itself, that it would be

to its own advantage to provide its own training. In general it had within itself adequate facilities for this purpose. Nobody could reasonably venture the opinion that engineers would always be better managers than accountants, but it was safe to assert that engineers who, in addition to technical experience also had administrative and commercial ability, would be more fitted to occupy the positions in question. It seemed essential that staff organisation should permit subordinates to exercise commercial responsibilities in order to fit themselves for subsequent managerial posts.

It was not easy always to reconcile the desire of youth to be served with the right of age to be privileged, in which respect the I.E.E. maintained an admirably commonsense balance.

Broadcasting Technique

TECHNICAL trends in sound broadcasting, without disclosing the substantial departures from pre-war distribution systems that hostilities had occasioned, were reviewed broadly by Mr. H. Bishop (assistant chief engineer, B.B.C.) in his inaugural address as chairman of the Wireless Section of the INSTITUTION OF ELECTRICAL ENGINEERS on November 5th.

Commencing with studio design, reference was made to the considerable divergence of opinion concerning the optimum shape of the reverberation time/frequency curve. The war stopped research into this subject, but experience of emergency studios, for which buildings with plenty of wood in their structures were preferred, confirmed pre-war theory and practice.

Microphone development had been directed towards obtaining different directional properties; the three main types had spherical, figure-of-eight and cardioid (single-sided) response diagrams. Both moving coil and double sided ribbon types were electromagnetic, being more reliable than those working on the condenser principle because a close-up amplifier was avoided.

In comparing old and newer concepts and means of controlling and switching programme input, an entirely different principle was mentioned for ensuring closer contact between programme presentation and technical operation. Although the major scheme intended for the extension to Broadcasting House had been delayed, its essentials had been adopted in some of the temporary studios now in use. The fresh principle was that control of dynamic range and balance must be exercised from within a studio cubicle, whence its own equipment could be energised and the outputs of its own microphones heard (during both rehearsals and transmission) without any manual operations being necessary elsewhere.

Wide use of negative feed-back amplifiers and pentode values enabled single units of high gain to be designed to perform several functions. Another economy was improved potentiometers that permitted fading and mixing at much lower levels than formerly. Means of regulating and measuring volume had been the subject of much research; including root-mean-square meters with an integration time of the order of 200 to 300 milli-seconds and peak meters reaching within 2 db of their steady state reading for an impulse of single-frequency tone of a duration of less than 10 milli-seconds. That value was chosen because an overload not exceeding 5 milli-seconds did not produce audible distortion.

A brief commentary on direct disc recording was followed by descriptions of circuits rented from the G.P.O. for interconnecting studio centres and transmitting stations.

An entirely new development was the transmission of television signals over ordinary underground telephone cables, provided special equalisers and repeaters were installed at intervals of between one and two miles along the route. When television line theory was applied to underground cables at vision frequencies there were two facts which could be turned to advantage. First, the attenuation-frequency characteristics of non-loaded paper insulated pairs of 6.5, 10 and 20 lb. per mile were all similar in shape. Therefore standard types of equaliser section could be employed for any of these three common sizes of line, the number of sections needed being determined by the length and gauge of line. Secondly, at the higher vision frequencies there was an ascertainable relationship between the attenuation and phase characteristics. Comparatively simple measurements, of the former enabled the latter to be predicted, thus providing the information needed for equalising both.

Standard equaliser sections had been designed to correct attenuation accurately and phase approximately. Non-dissipative phase-correction networks were also used to compensate for the residual phase distortion. Thus vision had been broadcast over 4.5 miles of telephone cable which supplemented the balanced-pair television cable permanently installed in the West End of London, with repeaters installed in three P.O. telephone exchanges.

Reducing Distortion and Noise Level

At present sound broadcasting was radiated in forty different languages, each transmission being directed towards that part of the world for which it was intended. The problems of aerial design and switching to achieve this aim were not easy to solve, while 24-hour service made plant maintenance a considerable task. The feed-back principle was now applied in various ways to practically all transmitters, to reduce distortion as well as the noise level on the carrier frequency caused by filament heating

supplies. The extremely large "gain" of powerful pentode valves had also contributed to the improvement of overall efficiency by reducing the number of amplifying stages.

It remained to be seen whether amplitude modulation on medium waves would be displaced by the Armstrong system of frequency modulation on ultra-short waves. Against its possible advantages were the facts that a band width twenty times greater was occupied and some ten million receivers in this country would be rendered unusable. But the method would doubtless have to be examined relative to some special services operating in parallel with more ordinary ones.

Reference to transmitter frequency control by quartz crystals (supplied to the B.B.C. by the radio branch of the G.P.O.) indicated that in B.B.C. oscillator circuits the supply voltage frequency coefficient had been reduced to a negligible value, so that the remaining cause of instability (of the order of plus or minus one part in a thousand millions) lay in the quartz plate and its mounting.

The mercury vapour rectifiers which energised valve anodes at 10,000 V were of the hot cathode type for transmitters up to 50 kW and of the steel tank type for larger plant. Several changes that had improved their reliability included the abandonment of induction regulation in favour of grid control.

Ionospheric Investigations

Concluding remarks on short wave propagation and ionospheric observation data collected in 1940, relative to wave band selection, indicated the disturbing effects of ionosphere storms on overseas transmissions, and briefly explained how transmitter frequencies were measured to check their performance.

Finally, there was the warning that in Europe, including the U.S.S.R., about 50 million receiving sets were in use, with about 10 millions in this country. The replacement rate was about 10 per cent. and more than two million homes were still unequipped with wireless sets. The potential peacetime market was large and makers must be ready to make up for lack of replacements during the war period. But straitened finance would leave the public with little money to spare. Reliability and improved servicing would be expected by the listening public, involving a greater measure of standardisation.

Wartime Problems

THE solution of problems brought about by the war was the subject discussed at the first informal meeting of the Installations Section of the INSTITUTION OF ELECTRICAL ENGINEERS in London on November 13th.

Mr. A. G. Ramsey (of the Ministry of Works and Buildings), introduced the subject by explaining that various suggestions had already been before the Section Committee which, in turn, expected all its members also to consider the matter very seriously for the furtherance of the war effort. First there could be simplification of operations in manufacture, with minimum use of expensive jigs and special tools, smallest amounts of materials, maximum of semi-skilled labour and fewest sub-contractors to reduce both manufacturing and selling costs.

Secondly, there was substitution, which presented difficulties, since alternative materials might themselves become scarce and have to be replaced by others that research would make available, generally involving fresh processes and special tools and resulting in less satisfactory products. Thirdly, standardisation in wartime must be confined to reduction of number of types, elimination of "specials," and simplification, limiting makers' activities to those types that could most easily be produced quickly and cheaply. The wartime accomplishments of the British Standards Institution were appreciated by both manufacturers and users. Substitution involved expense and delay due to changes in any case; standardisation in the wartime sense meant savings and increased output with larger monetary turnover. The demand for common electrical products was greater than the supply.

Manufacturers would be helped by designers and users simplifying their requirements, thereby reducing capital cost and saving installation time. Wartime "codes of practice" relating to installations of all kinds were needed to minimise the labour effort and secure speedy execution. Professional institutions had not done all they should have done towards the standardisation of such codes. To enable designers of installations to give effect to suggestions of this kind, they must know what makers had to offer; unfortunately up-to-date information about the characteristics and specific uses of substitute products was not readily available.

All-insulated Systems

While all schemes should continue to be based on the I.E.E. Wiring Rules, the Home Office Regulations and the requirements of other competent authorities, drastic modifications were necessary to achieve wartime objectives, reducing the life of installations to a few years. The basis of design should be "all-insulated" throughout, including accessories, fittings, distribution fuse-boards and switchgear. Wiring should be run on the surface, or in roof spaces and under floors, kept clear of timbers when unprotected, using v.i.r. cable on cleats. Conduit and t.r.s. cable should be used only in special cases, large cables to be strung on porcelain supports from trusses in open roofs, being protected with fire-resisting material where they passed through walls or were within 5 ft. 6 in. of floors. The teeing-off system should replace the looping-in method; flexible pendants must be restricted

and group switching must replace individual control. The latter, if essential, was obtainable by local ceiling switches and push-bar lampholders. The I.E.E. Regulation three-month life of temporary installations should be extended to, say, three years with overhaul at intervals. Final sub-circuit loading in temporary installations should be increased above the 1,000 W limit. The requirements of the Factory Acts and of the Electricity Commissioners must continue to be observed in all respects.

Plastics for Cable Insulation

THE possible application of plastic materials to cables was Mr. S. W. Melsom's main theme in his address as chairman of the Transmission Section of the INSTITUTION OF ELECTRICAL ENGINEERS on Wednesday. Despite some defects, he said, rubber was a wonderful material for cable insulation and breakdowns in well-made grades were probably not more than of the order of one per thousand miles. The reliability of paper cables, too, was proverbial and frequently samples taken from the ground after thirty years' service showed no sign whatever of deterioration.

In the face of this experience we could not turn over to any new material without the fullest assurance of at least as good service and without economic advantage.

At present there were four distinct groups of plastic materials of differing composition, each group containing a number of grades, which were under consideration for cable uses mainly as substitutes for rubber cables. These materials had a wide range of properties and, although generally it could not be said that they were even the equal of vulcanised rubber, many of them were unaffected by oxygen and by some reagents which were inimical to rubber.

An Indestructible Compound

Polyvinyl chloride compound was being used for these more extreme conditions of use and was proving satisfactory both as an insulation and as a protective sheath over a vulcanised rubber insulated core. Actually the insulating properties of this plastic material could be described as only moderate, but it was unaffected by oxygen, oil, acid, etc., was resistant to flame or fire, and so far as all ordinary conditions were concerned might be termed indestructible.

Rubber chemists had, however, by no means finished with improvements in rubber, and he predicted that the apparently parallel paths of rubber and plastics chemistry would ultimately be found to converge with great benefit to both. There was some evidence that a mixture of rubber and a high grade plastic produced a very good result indeed.

In the impregnated paper cable field it was difficult, on economic grounds, to visualise anything taking the place of paper for low-voltage cables. It was nearly as difficult for very-high-voltage cables, although a plastic material was being used as a constituent in one development of a gasfilled type of cable, and "Styrene" had been developed for super-voltage joints.

Synthetic rubbers had not been much used for cables. Generally they could not be justified on economic grounds and it was still to be proved that their qualities were superior or even equal to vulcanised rubber. There was therefore little sign at the moment of a synthetic rubber which would replace the natural product.

Though somewhat slow at the start, the work of the cable technologists in the field of super-voltage cables was approaching a reasonable degree of finality. The experts, however, were by no means agreed either as regarded the oil-filled cables *versus* gas-pressure types or on the merits of the various types of gas-pressure cable. Nevertheless the needs of the supply industry were fully served and we could safely leave the experts to improve their own types of cable, leaving the future to be settled on the basis of the most economical.

For many years the industry had pressed for a reduction in the number of sizes and types of cables, and the application of wartime practice to peacetime conditions appeared to necessitate early and ruthless consideration of the question on grounds of national economy.

Forthcoming Events

Institution of Electrical Engineers.—Thursday, November 20th, 4 p.m. London. Paper: "The Characteristics and Performance in Service of High-voltage Porcelain Insulators," by Mr. J. S. Forrest.

Wireless Section.—Tuesday, November 25th, 4 p.m. London. Informal meeting. Mr. P. R. Coursey to open discussion on ageing tests for radio components with particular reference to atmospheric conditions.

Mersey and North Wales (Liverpool) Centre.—Monday, November 17th, 5 p.m. Liverpool Royal Institution, Colquitt Street. Papers: "Control of the Domestic Load" and "Optional Control System of Domestic Supply," by Mr. P. Schiller.

North Midland Centre.—Saturday, November 15th. Paper: "The Characteristics and Performance in Service of High-voltage Porcelain Insulators," by Mr. J. S. Forrest.

North-Eastern Centre.—Monday, November 24th, 6.15 p.m. Neville Hall, Westgate Road, Newcastle-upon-Tyne. Informal discussion on post-war planning. Members unable to attend are invited to express their views in writing. *Students' Section.*—Friday, November 21st, 6.30 p.m. Neville Hall. Paper: "Modern Electric Clocks," by Mr. M. N. Karaosman.

Junior Institution of Engineers. — Saturday, November 15th, 2.30 p.m. 39, Victoria Street, S.W.1. Annual general meeting.

Royal Society of Arts.—Wednesday, November 19th, at 1.45 p.m. "Lighting in Wartime," illustrated with lantern slides, by Mr. J. S. Dow.

Compensation and Damages

An Important Judicial Decision and its Sequel

By F. E. Sugden, A.C.I.S.
Barrister-at-Law

A RECENT decision of the Courts in the case of *Dean* v. *Edwards & Co.* will, in my opinion, have far reaching consequences particularly from the electrical contractors' point of view.

Accidents are inevitable as are the consequent claims for compensation or damages made by the employees affected, upon their employers.

For many years there has been a hazy idea regarding the employer's position both under the Workmen's Compensation Act and in common law, including the Employers' Liability Act. Of course, if an employee meets with an accident arising out of and in the course of his employment in many cases the employer is liable. Though the financial strain is heavy under the Workmen's Compensation Act it is not unduly serious; a claim brought against him at common law or under the Employers' Liability Act may be much more serious and therefore it behoves the electrical contractor to study his liability under these two branches of the law.

The author discusses the implications of a recent action for damages for injuries brought against an employer consequent upon a lift accident

The facts of the case of *Dean* v. *Edwards & Co.* are these:—The plaintiff was employed by the defendants as a garage hand and in the course of his employment was instructed to take a motor vehicle from the ground floor by lift to the basement. The lift was operated by means of a rope loop set in motion by an electric motor, neither of which was fenced. In operating the lift the plaintiff sustained injury. While he was in hospital, the defendants' insurance company paid him weekly sums of fifteen shillings and sixpence, securing his receipts on a form in which liability under the Workmen's Compensation Act, 1925, was admitted, but which contained a clause precluding any other kind of claim. Meanwhile the plaintiff's father, as his agent, undertook correspondence with the defendants and their insurers, in the course of which he asked that payments on account of compensation should be paid to his son.

Acceptance of Compensation

The plaintiff received two sums of fifteen shillings and sixpence and signed a receipt which described this money as compensation due under the Workmen's Compensation Act of 1925. A week later, he received another sum of fifteen shillings and sixpence and initialed the same receipt form. Moreover, the defendants relied on certain letters written by the plaintiff's father whilst his son was in hospital, as a consequence of which the plaintiff, through his father, asked for and received payment of compensation under the Workmen's Compensation Act, 1925.

Section 29 of this Act provides that when the injury is caused by the personal negligence or wilful act of the employer, nothing in the Act shall affect any civil liability of the employer, but, in that case the workman may, at his option, either claim compensation under the Act or take proceedings independently of it. The employer, however, shall not be liable to pay compensation for injury to a workman by accident arising out of and in the course of the employment both independently of and also under the Act, and shall not be liable to any proceedings independently of the Act, except in case of personal negligence or wilful act.

Therefore, it will be seen, the employee must either choose his common law rights or the Workmen's Compensation Act rights. As a consequence the plaintiff signed a form which read as follows:—"Received of ..... Co., the sum of one pound, eleven shillings being the agreed and ascertained compensation due to me under the Workmen's Compensation Acts, 1925-1931, at the rate of fifteen shillings and sixpence for accident sustained whilst following my employment, such rate of compensation to be paid weekly during my total incapacity for work."

Decision Must Stand

The Court held, first, that the machinery used to operate the lift was "transmission machinery" within the meaning of the Factories Act, 1937, section 13, and should therefore have been fenced; and secondly that the defendants had been negligent in not providing guards. It was held, however, that the plaintiff was precluded from succeeding in in his claim for damages at common law as he must be deemed to have exercised the option contained in the Workmen's Compensation Act, 1925, section 29, referred to above. It was contended on behalf of the plaintiff that what he did was done in sheer ignorance and therefore he should not be held to his former choice. But the Court held that he had made his selection and must abide by it.

What, therefore, is the position where the

employer, purely through misadventure, fails or neglects to fence the machinery used by him and as a consequence one of his employees meets with an accident? Will the employee proceed under the Workmen's Compensation Act or will he proceed under Common Law, including the Employers' Liability Act? As will be seen later, the Workmen's Compensation Act is very limited in scope and, broadly speaking, the employee can only recover a few hundred pounds, whilst in the case of common law he may recover thousands of pounds.

Of course the employer may be covered by an insurance policy, but if he is involved in too many actions for negligence, he will find that the insurance company will either considerably increase his premium or refuse to effect insurance for him at all.

County Court Procedure

In the settlement of claims under the Workmen's Compensation Act where an application has been made for arbitration proceedings with reference to the County Court, no settlements can take place unless such settlement is sanctioned by the County Court. When the case comes up for sanctioning the judge will hear both sides of the case and all he is concerned with is: Is the amount of compensation offered or tendered, as it is termed, sufficient and adequate for the employee? If it is not, unless there and then a sufficient and adequate sum is offered he will refuse to sanction the settlement and will thus put the employer and the employee to the cost of having the case fully conducted in the Courts, sometimes with disastrous results for both parties.

I say "disastrous results" for this reason: sometimes employees bring actions against an employer without possessing the wherewithal to conduct them to the fullest extent; they cannot fully prove their case and therefore they lose their claim. Conversely an employer who contests one of these cases and involves himself in heavy expenses, even though he may win the case and in the ordinary course of events be entitled to claim costs, may find it impossible to recover them.

Therefore, it behoves the employer to make adequate settlements in suitable cases in order to prevent unfruitful litigation. I must also say that some cases should be contested because some employees will not in their own interest effect settlement without the assistance of the Court because they do not know what sum of money is adequate in the circumstances.

There was an interesting sequel to the case in question. The employee appealed against the decision and won his appeal, not on points of law, but by consent of his opponents.

The Court disapproved the action of the insurance company concerned in putting the particular form before the injured man for signature. As the company desired that it should not conduct its business so as to incur the disapproval of the Court, it decided to withdraw the defence and have the appeal allowed. It was stated that the employee was willing to accept the sum of £750 which was offered, and the Master of the Rolls accordingly allowed the appeal and entered judgment for the appellant for that sum and costs in that Court and below.

The Master of the Rolls further said that, as there had been judgment by consent, it was unnecessary for the Court to pronounce on the various questions which had been raised, and therefore he did not wish to comment upon the matter in view of the honourable attitude taken up by the company. He then made some general observations for guidance in the future. He said that insurance companies knew the difference between claims under the Workmen's Compensation Act and claims at common law, and that the latter were likely to be much more beneficial to an injured workman and much more detrimental to themselves as insurers. It was therefore more advantageous to the companies to secure from the workman, if they could, a claim which was tied to the Workmen's Compensation Act and abandoned the right to claim at common law.

Humane Treatment Counselled

Section 29 of the Workmen's Compensation Act had caused much difficulty in construction, but the view of the authorities appeared to be that if a workman, whether he knew of the option to which he was entitled or not, could be made to accept payment under the Act he was barred from asserting his rights at common law. The insurance companies were aware of this, and to put a form before a workman who might be suffering from shock with nobody near to advise him and then afterwards to say that because he had signed that form he had prevented himself from making a more advantageous claim, was an act of the shabbiest description.

When the workman was injured some payment should be made at once, so that his home could be kept together. Why insurance companies could not take a form of receipt without tying it to the Workmen's Compensation Act he could not understand.

Counsel for the insurance company stated that he was instructed to help the Court in every possible way, and the insurance company in this case was anxious for the fullest possible investigation, while denying that it was trying to take advantage of the injured man.

Summing up the Master of the Rolls' statement, it simply means that the employer should make an interim payment to the employee without binding him to make an election as to whether he shall proceed under the Workmen's Compensation Act or at common law. He should tell the employee what his rights are and wait until the employee has sufficiently recovered before he asks him for particulars of his claim.

Bulk Supplies

Inequity of Existing Tariffs

By Norman Elliott,
M.A., A.M.Inst.C.E., M.I.E.E.
(Borough Electrical Engineer, Gravesend)

THE computation of the wholesale price of electricity as supplied in bulk to authorised undertakings is based upon equity for the individual undertaking and not for the individual consumer. This has led to a tangle of intricacies, of which the most absurd is probably the calculations necessary under Section 13 of the 1926 Act, but what is worse, it has led to inequity for the ordinary consumer. The scope of the principle has unfortunately been extended by the Central Electricity Board which, in seeking equity as between its seven areas, offers different grid tariffs in each, whereas equity for the ordinary consumer throughout the country should be the paramount consideration. Equity for undertakings or areas is only of importance in so far as it fulfils that purpose.

All wholesale electricity should be sold to authorised undertakings on the same tariff but, because the 1926 Act was drafted in the shadow of the principle of equity to individual undertakings, Sections 7, 12, 13 and 14 were inserted. Consequently, fifteen years after the passing of the Act, only 12.5 per cent. of the total bulk supplies are purchased under the grid tariff while the revenue derived from them is 17.5 per cent. of the total—a most unsatisfactory state of affairs. Selected station owners must endeavour to obtain their bulk supplies at the lowest possible price and therefore juggle with Sections 7 and 13 to this end, the calculations under Section 13 having long since become false, fanciful and fantastic. Suppliers and purchasers of indirect bulk supplies under Section 12 juggle with that Section with the most usual result that the purchasers pay more for their supply than in fairness they should, the suppliers in general being large undertakings with complicated accounts and highly trained technical staffs.

Selected Station Owners Benefit

What is the result of all this juggling? Certainly not equity for the ordinary consumer who, through the medium of the Central Electricity Board, pays for all selected stations whether he lives at Land's End or John o' Groats. No, the result is that selected station owners obtain from the Central Electricity Board moneys to which they are not in justice (though legally) entitled and the Board in turn must reimburse themselves from the whole body of ordinary consumers throughout the country through the individual undertakings. Further, the undertaking giving an indirect bulk supply which obtains a higher price than it legitimately should under Section 12 makes an illegitimate profit at the expense of the purchasing undertaking, the consumers of the former presumably benefiting.

Equity for the ordinary consumer demands that Sections 7, 12, 13 and 14 be repealed, transmission charges on indirect bulk supplies be paid by the Central Electricity Board, pre-1926 Act agreements for bulk supplies be set aside and that bulk supplies should be sold at the same grid tariff, for the whole country.

The author urges the repeal of Sections 7, 12, 13 and 14 of the 1926 Act and the provision of bulk supplies throughout the country at the same grid tariff

The present system of offering different grid tariffs in different areas, adopted under the principle of undertaking equity, is manifestly unfair. The seven tariff areas are in fact geographically contiguous and treated electrically as a whole. Since the war, owing to abnormal outages, the electrical dependence of the areas upon each other has increased. The building of large munitions works and the evacuation and redistribution of the population have also redistributed the electrical load, further increasing electrical interdependence. Electricity is therefore being transferred from one tariff area to another *via* the grid lines, so that the transferee area receives the benefit of the generating plant installed in the transferor's area.

Pooled Plant and Pooled Charges

This pooling of the whole of the country's generating resources for the prosecution of the war and the convenience of the ordinary consumer is right and proper, but it must also be right and proper to pool the whole of the country's generation charges and charge these equitably to each consumer. One inequity that arises from the difference in grid tariffs is due to the basing of the wholesale price of electricity sold in each area on the price of coal in that area. Thus the financial benefit of selling in one area units with a high coal price which have been generated in another area at a low coal price (or *vice versa*) is spread over the whole country, the area taking the units receiving the benefit or otherwise at the expense of the whole country.

The national grid tariff should be a straight two-part tariff with one coal price and no stepping down of either kW or kWh charges.

The consideration of higher independent operation costs at small as compared with large generating stations, which is the primary argument for a stepped tariff, is a thing of the past; there is but one generating authority with many generating stations, both large and small, and that is the Central Electricity Board. The Board operates and decides the geographical situation of these stations to ensure that, for the country as a whole, the best use shall be made of the generating plant installed. It follows that generating costs whether low or high should be pooled and charged out equitably to all consumers.

The necessary legislation having been passed and a fair period of time allowed for undertakings to adjust their tariffs, then every undertaking throughout the country would buy its electricity wholesale at the same price. Differences of local load and power factors would be largely overcome by amalgamations between undertakings. Parliament could then rightly require every undertaking to offer to its consumers the same simple tariffs.

Professional Associations

Their Constitution and Responsibilities

By a Barrister-at-Law

THE young engineer is not unnaturally anxious to advertise and emphasise his professional status. His object in so doing is designed both to encourage public confidence and define his relationship to his professional colleagues. Several methods are open to him in compassing these purposes. The most obvious and, indeed, the least misleading is to qualify for a recognised university degree. But university degrees in this country (unlike America), are seldom sufficiently specific to identify the particular branch or subdivision of engineering in which the holder has specialised. Thus the engineer, whether he be an expert in radio, electricity, marine turbines, mining or bridge building, or other branch, will probably hold a bachelorship in science.

Complementary to the Universities, however, there exist many honourable and reputable professional societies whose principal objects are broadly to provide:

(*a*) Diplomas, fellowship or membership either by examination or on payment of a fee;

(*b*) Professional camaraderie which includes the publication of journals or proceedings, the holding of conferences and so forth;

(*c*) Protection to the profession as a whole by securing a uniformly recognised minimum standard of remuneration and conditions of employment;

(*d*) Rulings on questions of etiquette and conduct and, on occasion, representation of the profession collectively.

Such societies occupy a position of eminence and influence within a given sub-division of the science of engineering—or indeed beyond. A few are incorporated by charter and enjoy the patronage and support of world-famous names. Membership is a professionally cherished privilege widely sought but cautiously bestowed. To justify their probity and reputation, stringent conditions—intellectual as well as otherwise—are imposed on those aspiring to admission, thus precluding the indiscriminate acceptance of persons not likely to uphold the society's standards. In this way membership signifies a distinction which is properly and customarily symbolised by letters appended to the recipient's name. Such a qualification is not infrequently a *sine qua non* in many public appointments.

None could with propriety impugn the status, the value, or the motives of these great professional bodies. Their aims and functions are in accord with the highest and best traditions of English professional life. There are, however, many societies which have not achieved that degree of eminence or recognition, and many more whose repute is frankly dubious and whose motives are mercenary. How to distinguish between the worthy and the unworthy among these bodies is a problem requiring detailed information not readily accessible.

A recent prosecution has shown the necessity for engineers who wish to join suitable organisations in their industry to be able to distinguish those which are genuinely representative from those which are not

Recently at Salford a man was sent to prison for running what was described as a bogus business under the name of the Royal Institution of Radio Engineers. On payment of a fee, the letters A.M.I.R.E., M.I.R.E., and Fel. I.R.E., were bestowed by the "Institution." According to the evidence there were 1,800 members. The addition of these letters to the purchaser's name was doubtless intended to impress the lay public.

The public does not relish being deceived in

(The association to which the author refers must not be confused with the British Institution of Radio Engineers which recently merged with the Institute of Wireless Technology.—Eds. Elec. Rev.)

this fashion and radio engineers themselves resent such an imposition. Many have inquired why and how these institutions can come into existence and flourish. Why, they object, does the law permit such creations? The answer is that the law is, in general powerless to intervene. Apart from companies, partnerships and bodies incorporated by charter or statute—all of which are regulated by a considerable corpus of law—the association of men for objects and purposes which are not unlawful, has been recognised with tolerance but without control.

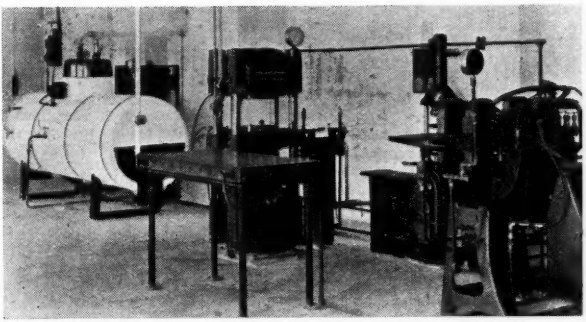
Few systems of law have been able successfully to deal with the existence of organised group life. This is due to the fact that the voluntary association has no inherent legal being or entity apart from its members. A company, even though it has only three members, enjoys a distinct and separate personality in law. It can sue and be sued. But an association is merely a descriptive name for a collection of men who have joined each other in voluntary agreement for certain general objects. Well known examples are the London Stock Exchange—which is still a voluntary association—the London Library and the Inns of Court. The latter—the home of the English Bar—is indeed, the most ancient unincorporated society in the Kingdom, an odd and significant survival.

The freedom of these and similar associations from restraint imposed externally is really inspired by the regard which the law pays to the concept of the freedom of contract. Yet this freedom may be—frequently is, in practice—largely illusory. For the associations can and do create their own fetters. The most obvious method is the creation of a trust deed which regularises the association's constitution in strict terms. Trustees are appointed, in whom is vested, subject to certain conditions, the legal title to the association's property. For most purposes the trustees are in law the personality of the association. But it should be emphasised that the existence of a trust deed is not essential to the existence of the association and is in no sense compulsory. Unless, however, the association is a famous one with an established public reputation, the absence of a formal trust defining its constitution should rightly invite suspicion. For without an instrument of this nature the association is virtually uncontrolled.

It will be appreciated from what has been said that there is no legal bar to the formation of societies with high-sounding names and no legal control over such bodies when they have been created. But those to whom they appeal for support can observe certain precautions before consenting to become associated with them by membership or otherwise. Where the repute of the society is in question, care should be exercised over the direct purchase of diplomas. Any invitation to join a professional body whose principal object is to distribute "letters" or "qualifications" indiscriminately, should be received with reserve. Particulars should be sought of the constitution and status of the body and in the case of one not falling within some well established category, inquiries should be made whether it is regulated by a trust deed. A negative response ought speedily to conclude any desire to be connected with it.

Steam for Industry

WHERE the steam demand for an industrial process is initially large, the additional capacity obtainable from an electric boiler through the incorporation of an accumulator may enable requirements to be met without unduly increasing the electrical demand. This entails raising the pressure to a higher value than that normally required and for short periods flashing the water into steam through a pressure reducer. Completely automatic operation is obtainable with temperature regulation within 2 or 3 deg. F. and thermal efficiencies of the order of 95 per cent. are claimed with a steady load at unity power factor. The accompanying photograph shows an 80-kW boiler (normal rating) supplying steam at from 25 to 75 lb. per sq.in. which has been installed for a gramophone-record producing concern by the Australian General Electric Co., the steam generator being of the immersion-heater type with current-limiting relay.



Record-moulding presses supplied from an 80-kW boiler

COMMERCE and INDUSTRY

Ensuring Full use of Plant. Controlled Electrical Exports.

Industrial Electrical Equipment

AN Electrical Advisory Panel has been set up by the Controller General of Machine Tools and Equipment to assist and advise the Directorate of Industrial Electrical Equipment and to ensure that experience from all branches of the industry is available. The following have been appointed to serve on the Panel:—Messrs. H. W. Bosworth, Lancashire Dynamo & Crypto, Ltd.; F. V. Brook, Brook Motors, Ltd.; D. Maxwell Buist, B.E.A.M.A.; E. C. Holroyde, Crompton Parkinson, Ltd.; L. J. Hunt, Electric Construction Co., Ltd.; J. S. Ramsden, British Thomson-Houston Co., Ltd.; T. G. Travis, General Electric Co., Ltd.; and J. R. Walton, Electrical Apparatus Co., Ltd. As already reported, the Director of Industrial Electrical Equipment is Mr. S. F. Steward, Ministry of Supply.

The Directorate has been formed to undertake central planning in connection with industrial electrical equipment, including rotating machinery (motors, generators, convertors and frequency changers), static equipment (transformers and rectifiers, and condensers for power factor correction and phase conversion), and switchgear and control equipment (starters, regulators and associated equipment, switches, fuses, switchboards, distribution boards, circuit breakers and isolators).

Equipment required for Admiralty purposes, for ground radio or air borne purposes, or for generation, transmission or high-voltage distribution by electricity supply undertakings or industrial undertakings is excluded from the scope of the Department, the duty of which is to assess supplies and demands and to see that such action is taken as may be necessary to secure the most efficient use of production capacity.

Machine Tools from America

The Ministry of Supply has made arrangements for acquiring from the United States under the Lease-Lend provisions machine tools, parts and accessories and for their distribution here through registered merchants. An Order issued last week, the Control of Machine Tools (No. 8) Order, 1941, stipulates that these shall be sold only at the prices certified by the registered importers (apart from a reasonable addition for expenses) and only to persons buying the equipment for use and not for disposal.

Export Control

The Export of Goods (Control) (No. 37) Order, 1941, dated October 28th amends the First Schedule to the No. 19 Order issued last May Group 12 is replaced by Groups 12 (1) and 12 (2); the latter includes electrical goods of the following descriptions:—

Apparatus and appliances of a kind used for domestic purposes and parts thereof, wholly or mainly of metal*; accumulators and batteries and battery cans*; bells, buzzers and indicators and parts thereof, wholly or mainly of metal*; bulbs and shells for electric lamps; carbons, electric, all types, including carbon electrodes; parts of transformers, condensers, resistances or insulating supports made wholly or partly of soapstone, steatite or titanium dioxide; hair curling, waving and drying appliances and parts thereof, wholly or mainly of metal*; indicating, measuring, recording and testing instruments*; lighting and wiring appliances and fittings, wholly or mainly of metal*; magnetos and parts thereof; massage appliances and parts thereof, wholly or mainly of metal*; overhead line accessories*; permanent magnets and electro-magnets; pocket lamps, hand torches and inspection lamps and cases therefor*; searchlights and parts thereof; sparking plugs; thermopiles and thermocouples; wireless valves and other electric discharge tubes and parts thereof; and X-ray apparatus and parts thereof.

The export of these from the United Kingdom is prohibited save under licence from the Board of Trade. The items marked with an asterisk are additions to the existing list as are parts of X-ray apparatus and electro-magnets.

With reference to Order No. 36 mentioned in our October 31st issue, it should be noted that tubes, pipes and pipe and tube fittings of all kinds are now on the controlled list and that the machine tool item has been extended to embrace all machine tools and parts and accessories therefor, including jigs and fixtures.

Order No. 38 issued last week adds welding electrodes and lightning conductors to the control list.

Engineering Workers' Wages

An agreement has been reached between the Engineering and Allied Employers' National Federation and trade union representatives whereby the wages of women workers in the engineering industries will be increased. The increase in the basic rate ranges from 3s. for young women of 18 to 5s. for those of 21 and over. The respective basic rates for these women are now 19s. and 25s. and the total weekly wages 37s. and 43s.

A claim for increased wages for non-apprenticed boys and youths in the engineering industry under the age of 21 has been rejected by the National Arbitration Tribunal.

Control of Plastics

The Minister of Supply has made the Control of Plastics (No. 2) Order, 1941, under which the provisions of the Control of Plastics (No. 1) Order, 1940, controlling acquisition, disposal, treatment, use and consumption of certain plastics, are extended to cover synthetic resins in the production of which formaldehyde, cresol, phenol, urea or thiourea has been used. Applications for licences under the Order, which comes into force on November 17th, should be addressed to the Ministry of Supply, Plastics Control, Great Burgh, Epsom, Surrey. Copies of the Order may be obtained from H.M. Stationery Office.

Limitation of Supplies in Canada

As from October 1st the production of radio receivers, refrigerators, cookers, vacuum cleaners and electric washing machines in Canada has been reduced to 75 per cent. of the 1940 output. In announcing this limitation the Dominion Department of Munitions and Supply states that this preliminary reduction in production will result in

the following estimated decreases:—Radio receivers, 123,000; electric washing machines, 25,000; electric refrigerators, 13,000; electric stoves, 7,700; gas stoves, 7,700; vacuum cleaners, 10,000. Manufacturers have further been warned that there can be no guarantee that materials will be available for production of the regulated goods even on the lower production basis. Advisory committees are to be set up covering each of the industries affected, which will thus themselves co-operate with the controller of supplies in the diversion of their output from civilian to war needs.

The limitation of production is described by the Department as "a smashing blow at the production and sale of non-essential consumer goods in wartime, and while aiming at conserving steel, metals, and other materials urgently required for war purposes, it also curtails the trend toward increasing consumer purchasing in Canada, which cannot be allowed to interfere with war production. It is but a part of further studies and steps which will be taken to harness Canadian industry to the ever expanding demands of war."

Price Control in Canada

After November 16th, prices of most goods in Canada must not rise above the highest levels reached in the period September 15th to October 11th. This is the effect of the new Price Control Order which covers a wide range of services, including railways, telegraphs, telephones, electricity, gas, steam heat, water, restaurants and cinemas. Goods for export are exempted. A fine of $5,000 with two years' imprisonment is prescribed as a penalty for offences against the Order.—*Reuter* (Ottawa).

Factory Lighting Data

Owing to the increased efficiency of modern lighting fittings it has been found necessary to make certain alterations in the coefficients of utilisation of industrial diffusing fittings as given in the E.D.A.-E.L.M.A. publication, "Modern Factory Lighting," and the E.L.M.A. Lighting Service Bureau handbook, "Illumination Design Data." Approximately 40,000 of the former and some 6,000 of the latter have been issued and those possessing either book may apply to the Lighting Service Bureau, 2, Savoy Hill, London, W.C.2, for a gummed slip which can be stuck over the old figures. The new figures are as follows:—

Lighting Fitting	Room Index	Coefficients of Utilisation			
Reflectors with enclosed globe such as industrial diffusing tungsten, tungsten mercury, and blended tungsten and mercury.	A	.26	.29	.27	.31
	B	.31	.34	.33	.38
	C	.37	.41	.39	.44
	D	.43	.46	.45	.50
	E	.48	.51	.50	.55
	F	.52	.54	.53	.58

Cast Iron Research

So heavily engaged has the British Cast Iron Research Association been in work related directly to the war effort that its annual report, submitted to the annual general meeting in Birmingham on November 12th, is necessarily couched in the most general terms without disclosing details. The national situation calls for the fullest use of native iron ores, the most readily accessible of which are the phosphoric type. The Association's several laboratories were very fully occupied in 1940–41, some of them carrying loads nearly twice as great as in 1939. The training of laboratory apprentices has been extended by providing some of them with a period of practical instruction, in which connection the Midland Electric Manufacturing Co., Ltd., Revo Foundry Co., Simplex Electric Co., Ltd., and Walsall Conduits, Ltd., have rendered valuable assistance. Activities of the British Foundry School have been suspended for the duration of the war. Both the Association membership and total income increased slightly and running expenditure was reduced, but the desirability of finding fresh permanent premises has assumed greater urgency.

Registered Electrical Contractors

At a recent meeting of the Executive Committee of the National Register of Electrical Installation Contractors, applications for registration were accepted from the following:—W. J. Bunting, Belfast; F. Hallam, Mansfield; E. A. Blackburn, Ulverston; A. Deakin & Co., Manchester; Hartley & Co., Shrewsbury; D. Tillston, Liverpool; Knights (Hendon), Ltd., London, N.W.4; and J. Lord & Son, Pontefract. At the same meeting one application was withdrawn.

Reservation of Welders

The Ministry of Labour has reduced the age of reservation of electric welders (general hands) from 23 to 21 in protected establishments. For non-protected establishments the age is 35.

Cheerful Rationing

The November number of "Cheerful Rationing," published by the Electrical Association for Women, 20, Regent Street, London, W.1, price 1d., marks the second anniversary of this useful little leaflet. Such recipes as boiled spice cake, custard fruit mould, fresh fruit mould, all suitable for the Christmas season, are given in this issue.

Price Increase

Santon, Ltd., announce that the present war price advance of 27½ per cent. has been increased to 33⅓ per cent. on all their products except rotary switches, automatic lightbuoys and signalling torches, the advance on which items remains for the present at 27½ per cent.

Building and Civil Engineering Labour

The Minister of Works and Buildings has made an Order (S.R. & O. 1941, No. 1642) calling for a return from all persons (other than those who were required to register as building or civil engineering contractors) who employ labour engaged in building or civil engineering activities. The main purpose is to obtain information as to the building and civil engineering labour employed in industries other than the building and civil engineering industries themselves. The returns will, therefore, cover workpeople engaged on maintenance work, as well as on the new building and civil engineering work, who are employed by persons other than registered builders and civil engineering contractors.

Information is required as to the number and trades of persons engaged in such activities, and as to the value of work done by them in October, 1941. The trades concerned include joiners and carpenters (when engaged on work in connection

with building and civil engineering not on shop work); bricklayers; slaters and tilers; painters; plasterers; plumbers; glaziers; builders' labourers; and persons engaged generally in the construction, reconstruction, alteration, repair, maintenance, decoration or demolition of buildings or fixed works of construction (including excavation, levelling, the making of earthworks and foundations, the laying of pipes and sewers, the construction of roads and railways, tracklaying, etc.).

Copies of the form (B.C.E.4) on which the return is to be made are available at local offices of the Ministry and they must be filled in and returned to the Ministry of Works and Buildings, London, S.W.1, not later than November 22nd. Instructions will be found in Part A of the form.

Inspection of Plant

The Ministry of Labour and National Service has made the Factories (Examination of Plant) Emergency Order, 1941 (Stationery Office, 1d.; S.R. & O. No. 1702). This extends, under certain conditions, the periods within which inspection of certain plant and machinery must be made under the Factory Acts and other regulations. It is necessary to secure a certificate in specified form from the inspecting company that such extension can safely be made. The following classes are covered: the maximum extension of period allowed being shown in parentheses:—Hoists and lifts (3 months); chains, ropes and lifting tackle (3 months); cranes and other lifting machines (4 months); steam boilers (4 months); steam receivers (3 months); air receivers (3 months); lifting machinery (under the Docks Regulations, 1934) (6 months); and hoisting and lowering machinery (under the Shipbuilding Regulations, 1931) (6 months).

Record American General Electric Orders

Orders received by American General Electric Co. during the first nine months this year reached a record total of $831,390,000, compared with $397,810,000 for the same period last year. During the three months ended September 30th, orders received amounted to $310,251,000, a record volume for a quarterly period.

Arduous Duty Contacts

How powder metallurgy is widening the scope of producers of alloys for particular requirements is indicated in a 26-page illustrated brochure issued by Compound Electro Metals, Ltd., 42, Pall Mall, London, S.W.1. It describes technically the production, by a combination of metals, of materials possessing special mechanical and electrical characteristics, such as the "Elmet" range employed for making electrodes and facing dies of welding machines, including also "Copelmet" for facing the contacts tips of oil-break switchgear and "Silvelmet" recommended for contacts operating in air, their durability under localised heating ensuring added security in arduous service.

Battery Vehicle Prospects

Discussing immediate prospects for the battery electric vehicle in a letter to the *Commercial Motor*, Mr. E. H. Richardson, joint managing director, Associated Electric Vehicle Manufacturers, Ltd., stated that so far as the year 1941 was concerned, the company was undoubtedly restricted by reason of the licensing system, but all manufacturers of electric vehicles were now receiving a quota of steel in order to produce new vehicles, and there was reason to believe that the production in the future might be even greater than in previous years, including 1940. Nevertheless, while it was correct to say that war conditions provided opportunities for electric vehicles hitherto not available, it must be remembered that electric-vehicle manufacturers, in common with other industrial units, had in the national interest accepted contracts for war work of some kind or other, which had taken up a very considerable portion of their capacity.

Dominion Standards

Copies of standard specifications have recently reached this country from Canada: C.E.S.A.—C.22.2—No. 28—1941, concerned with the construction and testing of all-asbestos and asbestos varnished cambric insulated wires and cables; also C.E.S.A.—C.22.2—No. 58—1941, dealing with isolating switches. Others from Australia are: Emergency standards (E) C.501—1941, concerning graphical symbols for the equipment of motor vehicles and (E) D.1502—1941 dealing with varnished cambric insulated cables for power and lighting on aircraft. Copies of the Australian documents can be purchased for 1s. 3d. each from the Publications Department, British Standards Institution, 28, Victoria Street, London, S.W.1, while those from Canada may be inspected at the same address.

TRADE MARK APPLICATIONS

THE following applications have been made for British trade marks. Objections may be entered within a month of November 5th.

HERCULACKER. No. 616,039, Class 9. Lacquered wires and cables for electrical purposes. The Concordia Electric Wire Co., Ltd., Trent Mills, Derwent Street, New Sawley, Long Eaton.

DECORONA. No. 616,053, Class 11. Lampshades. Specialities (Liverpool), Ltd., Ornatus House, Coopers Row, Paradise Street, Liverpool.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

AVIONAL synthetic material (believed to be insulating).

A. C. Gilbert & Co., present address.

ELECTRICITY SUPPLY

Ulster Negotiations. Lower Charges at West Bromwich.

Accrington.—NEW SWITCHGEAR.—Sir Thomas Higham (for 36 years chairman of the Electricity Committee) referring at a meeting of the Town Council on November 4th to a recommendation that the electrical engineer (Mr. A. W. Clegg) should be authorised to put certain work in hand, explained that this referred to the switchboard at the electricity station which had been condemned as unsafe. A patch job could be done for a small sum, but it was his (Sir Thomas's) recommendation—and the engineer agreed—that this alteration should be in the nature of an extension requiring larger gear. The engineer had this scheme in hand and the Central Electricity Board had offered to send a skilled engineer to assist in anything the Committee decided to do with the switchboard. Sir Thomas said he hoped that what was done would be in the nature of, or part of, a reorganisation of Accrington's electricity undertaking.

Audenshaw.—SHELTER LIGHTING.—The Urban District Council is inviting tenders for the installation of electric lighting in communal surface air-raid shelters.

Blackpool.—MAINS AND SERVICES.—The Electricity Committee is seeking sanction to borrow £10,000 for mains services.

Hastings.—SUPPLY TO FARM.—The Electricity Committee is to provide a supply to Wylands Farm, Catsfield.

Hawick.—OPTION TO PURCHASE UNDERTAKING.—Application has been made by the Town Council to the Electricity Commissioners for an extension of three years in the period of the Council's option to buy the electricity undertaking in the town, which is at present held by the Urban Electric Supply Co., Ltd., on a 42-year lease from 1899.

Kettering. — SHELTER INSTALLATIONS. — The Town Council proposes to have shelters heated and lighted at a cost of £1,485.

Leeds.—PRICE INCREASE DISAPPROVED.—The Board of Trade has declined to approve the City Council's proposal to increase electricity charges, but has suggested that the position can be further considered when the results of the present year's working of the undertaking are known. The City Council is expected to send a deputation to interview the Electricity Commissioners and, if necessary, the Board of Trade on the question. The proposed increase was on account of higher fuel costs.

London.—J.E.A.'s BORROWING POWERS.—At the meeting of the London and Home Counties Joint Electricity Authority on November 6th it was reported that the question of increasing the Authority's borrowing powers had been discussed with the Electricity Commissioners, and as a result it was proposed to take steps forthwith for the promulgation of an order for this purpose. The maximum amount which may be borrowed by the J.E.A. under the London and Home Counties Electricity District Order, 1925, is £7,000,000.

BATTERSEA SHELTER INSTALLATIONS. — The Emergency Committee of Battersea Borough Council has recommended the installation of electric lighting in air-raid shelters at a cost of £11,789 and heating at £7,995.

CAMBERWELL.—The Borough Council has granted permission to the County of London Electric Supply Co., Ltd., to carry out works in Verney Way.

HACKNEY.—The Borough Council has received sanction to borrow for the extension of the generating station.

HAMMERSMITH.—The provision of an electricity supply to a Metropolitan Water Board pumping station at an estimated cost of £1,000 has been approved by the Borough Council.

POPLAR.—For shelter lighting and heating the Emergency Committee has agreed to the payment of 1s. per quarter per person (sleeping capacity) plus a running charge of 1d. per kWh.

WANDSWORTH.—The Borough Council has approved a proposal submitted by the County of London Electric Supply Co., Ltd., for laying underground electrical conduits.

Manchester.—FURTHER INCREASE IN COAL PRICE.—Having received a report indicating an increase of 1s. 6d. per ton in the price of fuel marketed by the Lancashire Associated Collieries, the Electricity Committee has expressed its grave concern at the continual advances in the cost of coal.

MODIFIED LIGHTING.—In the annual report of the Corporation Highways Committee it is stated that the installation of modified street lighting is not yet completed and modified units have been installed as follows:—Electric, 4,198; gas, 3,931. Expenditure on electric lighting was £35,595 and on gas lighting, £17,842.

Middlesbrough.—MAINS EXTENSIONS.—Sanction has been received by the Town Council to borrow £1,252 for mains.

Northern Ireland.—MINISTER CONFERS WITH ELECTRICITY COMMITTEE.—Our Belfast Correspondent reports that the Minister of Commerce, Sir Basil Brooke, met members of the Belfast Electricity Committee on November 4th to discuss the future of electricity generation and distribution in Northern Ireland. After the Minister had outlined the Government's attitude, agreement was reached on the principles to be followed in formulating the details of a scheme satisfactory to all parties.

It is generally believed that a merger of the Belfast, Londonderry and Larne schemes will take place under Government control. Anyway, a special meeting of Belfast Corporation is to be held to consider the report on the negotiations referred to. Discussions have been proceeding since May with regard to making provision for power supplies in the event of an emergency. It is understood that the Ministry has suggested the setting up of a new body to control all undertakings. One of the chief points at issue is what control Belfast Corporation would have in any new organisation. According to the *Daily Telegraph*, Belfast Corporation will select four members, Derry one and Larne one, but the Corporation will have no control over the discussions of the board. The chairman, it is stated, will be nominated by the Government.

At the monthly meeting of the City Council on November 3rd it was suggested that the Corpora-

tion should enter into a "lease-lend" arrangement with the Government for the duration of the war.

Sheffield.—POWER TARIFF REVISION ABANDONED.—During the summer the Electricity Committee had under consideration a 10 per cent. increase in charges, but it was learned that official approval was unlikely to be accorded to the suggestion. Subsequently it was proposed that the "unit" charge under tariffs 3 (a) and (c) should be based on an average cost of coal to the Department of 22s. per ton, these tariffs not being at present subject to a coal clause. On the suggestion of the Board of Trade, however, the Committee has abandoned the proposal. It has decided to review the whole question of electricity charges towards the end of the financial year.

ALLOCATION OF SURPLUS.—The Electricity Committee is seeking sanction to use out of the anticipated surplus £6,000 for meters, £2,500 for substation buildings and £3,000 for apparatus.

Smethwick.—SHELTER LIGHTING.—The Corporation Emergency Committee is proceeding with electric lighting installations in shelters at a cost of £517.

South Shields.—BULK SUPPLY CHARGES.—The Town Council has been pressing the North-Eastern Electric Supply Co., Ltd., to agree to the reduction in charges for bulk supplies recently granted to the smaller undertakings being applied to supplies by the company to parts of the Corporation's area. The company has suggested that, to settle the matter, the charges for bulk supplies to the added area, and for the four years beginning January, 1941, should be the same as those in respect of the smaller undertakings. The company has offered to pay an agreed sum to the Corporation in lieu of reduced charges prior to January last. The offer has been accepted.

Swinton and Pendlebury.—POWER PLUGS.—Power plugs are to be installed in public shelters at Birchfields, etc.

Tynemouth.—ENGINEER CONGRATULATED.—The Town Council has congratulated the borough electrical engineer on the excellent results obtained by the electricity undertaking during the past financial year.

West Bromwich.—TARIFF REDUCTIONS.—The Electricity Committee recommends the reduction of the flat-rate lighting tariff for shops and business premises from 6d. to 5d. per kWh and the flat-rate lighting tariff for domestic premises from 5d. to 4d., concessions which represent about £1,100 per annum. It is also proposed to make reductions in the maximum demand tariff equivalent to £2,500 per annum.

LOANS.—The Electricity Committee is seeking sanction to borrow £5,000 for mains and services and £2,000 for meters.

Wolverhampton.—LOAN.—The Electricity Committee is seeking sanction to borrow £2,000 for switchgear and substation equipment.

Overseas

Argentina.—POWER PLANT SURVEY.—The *Revista Electrotecnica*, official organ of the Argentine Association of Electrical Engineers, reports that there were 946 electric power stations in operation in the country at the end of 1939 with a total capacity of 1,220,563 kW, compared with 931 stations and 1,177,185 kW of plant at the close of 1938. The production of power during the twelve months (1939) is given as 2,461 million kWh, as against 2,328 million kWh in the preceding year, while the number of consumers advanced from 1,362,736 to 1,446,149.

Eire.—INCREASED CHARGES.—As foreshadowed in its annual report, the Electricity Supply Board has found it necessary to raise its charges, and an increase of 10 per cent. takes effect this month. In an official declaration regretting this necessity the Board states that the annual output of electricity is now about 450 million kWh; of this the hydro-electric plant on the Shannon can supply 290 million kWh in a year of average rainfall. Thus 35 per cent. of the demand must be met by the Pigeon House steam plant, and the price of coal has a serious effect on costs. The price of coal has risen by 75 per cent. and the fuel is of inferior quality, the Board states.

In a criticism of the increase, the *Irish Times* states that the saving of fuel aimed at depends on the "extent to which people can afford to avail themselves of public amusement and the temperature of the coming months." "Neither the E.S.B. nor the Gas Co. has seen fit, during recent weeks, to make a straight and positive statement concerning its resources of fuel. If the Shannon had been developed to its full extent—which as we understand would have been practically impossible—or if the Liffey scheme had been brought under way a year earlier, the country would now be independent of imported supplies of coal for its electricity. Unfortunately these precautions were not taken with the result that the Pigeon House station, which consumes an enormous quantity of coal in the week, is needed to supply the requirements of Dublin and the surrounding district." The *Irish Times* fears now a rise of gas prices and anticipates that gas will be soon rationed in Dublin as is the case already in a number of provincial towns.

TRANSPORT

Birmingham.—NEW TROLLEY-BUS ROUTE.—The Minister of War Transport has made the Birmingham Corporation (Trolley Vehicles) Order, 1941, authorising the provision of a new trolley-bus route within the city of Birmingham and urban district of Solihull. The length of the route is 1½ miles.

Brazil.—RAILWAY ELECTRIFICATION.—According to the Bulletin of the Brazilian Federal Council of Foreign Trade, there were about 437 miles of electric railways in operation in Brazil at the end of 1940. Of the lines in operation about 207 miles belong to the St. Paulo Railway Co., 94 miles to the Brazil Central Railway and 90 miles to the Mineira de Viacao system. Short lengths of electric railways are also operated by the Campos de Jordao and Corcorado companies.

London.—ACQUISITION OF "SOUTH AFRICAN" TROLLEY-BUSES.—It is reported in *The Times* that certain South African municipalities had uncompleted contracts in this country for trolley-buses, and that the London Passenger Transport Board has acquired some of these vehicles. The trolley-buses are 8 ft. wide, and their operation in London will be watched with considerable interest as there has been a feeling that slightly wider vehicles would increase the comfort of the passengers. Each trolley-bus has a 100 HP motor, probably the largest ever used in this country, and there is seating capacity on some of the vehicles for 72 passengers. There will be 43 of these trolley-buses, and they will be operated in the Ilford district.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The United River Plate Telephone Co., Ltd., records gross earnings for the six months ended June 30th amounting to £2,110,728, as compared with £2,125,345 in the corresponding period of 1940. Operating expenses totalled £1,021,768 (£1,009,632). Depreciation took £472,670 (£455,401), while instead of a loss of £294 on exchange there was a profit of £15,266. General interest charges decreased from £40,716 to £38,403 and debenture interest from £185,344 to £183,462. The net income at £409,691 was £24,267 lower.

The Vera Cruz Electric Light, Power & Traction Co., Ltd., reports an operating revenue of £41,425 for 1940, as against £36,596 for 1939. Expenses and taxes absorbed £43,281 (£39,850), leaving a loss of £1,857 (£3,254), to which is added net exchange loss of £666 (£5,807). After deducting reversal of provisions for contingencies in prior years £299 (nil), a debit of £110,053 (£107,830) is carried forward.

The Tellus Super Vacuum Cleaner Co., Ltd., shows a trading loss of £3,979 for 1940, as compared with a profit of £110 in 1939. To this is added a debit of £12,480 brought in, £2,000 reserve for sundry loans and advances, £115 for depreciation and £200 for directors' fees, making a debit balance of £18,774 to be carried forward.

The Hankow Light & Power Co., Ltd., records a net loss of £3,594 for the year ended March 31st. This compares with £7,784 for the preceding year. A credit of £1,170 is carried forward (£4,763). The directors state that as a result of severe retrenchments in Hankow and a revision of rates, they are not unhopeful that the current year's working result will show considerable improvement, but there are many factors beyond the directors' control.

The Shawinigan Water and Power Co. and the **Quebec Power Co.**—Duplicate cheques for the August, 1941, dividend for both companies were mailed from Montreal on October 30th. The originals were lost through enemy action.

Tube Investments, Ltd., are lowering their final ordinary dividend from 13¾ to 10 per cent., making 20 per cent. instead of 23¾ per cent. for the year.

The Revo Electric Co., Ltd., is maintaining the interim dividend on its ordinary shares at 5 per cent.

The Kalgoorlie Electric Power & Lighting Corporation is to pay an interim dividend of 3 per cent. (same).

Murex, Ltd.—A proposal to convert the shares in the capital of the company to stock was unanimously approved at the ordinary general meeting held last week.

The Delhi Electric Supply & Traction Co., Ltd., is to pay an interim dividend of 4 per cent., tax free (same).

J. & F. Stone Lighting & Radio, Ltd., are paying a first and final ordinary dividend of 5 per cent.

Broadcast Relay Services, Ltd., are maintaining their interim ordinary dividend at 5 per cent.

Ward & Goldstone, Ltd., are again paying an interim dividend of 10 per cent.

R. & J. Dick, Ltd., are to maintain their dividend at 10 per cent.

New Companies

Gahagan & Barlow, Ltd.—Private company. Registered November 4th. Capital, £2,000. Objects: To carry on the business of electrical and general engineers, metal workers, machinists, smiths, millwrights, electric welders, manufacturers of, and dealers in, electrical equipment, including cable, lamps, steel tubing, switches, insulating materials, wireless and other component parts, motor cars, etc. Directors: J. J. Gahagan, "Ballaberna," 9, Noctorum Avenue, Noctorum, Birkenhead; and G. W. Barlow, "Roscrae," Leyfield Road, Liverpool, director of George Whitley, Ltd. Registered office: 62, Dale Street, Liverpool.

B. B. Electrical & General Engineering Co., Ltd.—Private company. Registered October 30th. Capital, £3,000. Objects: To acquire the business carried on at Capitol Buildings, Empire Way, Wembley, as the "B.B. Electrical and General Engineering Co." Directors: J. D. V. Bennett, 64, Castleton Avenue, Wembley, and Dorothy G. Bridge, 27, Arragon Road, Twickenham, Mdx.

Fulmen Engineering, Ltd.—Private company. Registered October 28th. Capital £1,000. Objects: To carry on the business of manufacturers of, and dealers in, electrical batteries, dynamos, lamps, stoves, switchboards, fans, control gear, insulating materials, etc. Directors: J. P. Spencer, 31, King's Court North, King's Road, S.W.1, and three others.

Intercommunicating Telephone Manufacturing Co., Ltd.—Private company. Registered October 31st. Capital £100. Objects: To carry on the business of manufacturing, dealing, hiring, erecting, installing and maintaining plant used in connection with telephones and telegraphs and electrical apparatus, public or private, etc. T. W. Torrance, 8, Grange Avenue, Leagrave, Luton, is the first director. Registered office: 8, Grange Avenue, Leagrave, Luton, Beds.

Kepkold, Ltd.—Private company. Registered October 29th. Capital, £100. Objects: To carry on the business of refrigerating, electrical and general engineers, manufacturers of, and dealers in, temperature controlling apparatus, etc. Directors: D. R. Earle, 51, Broadfields Avenue, N.21, and J. E. Langford, 5, Laburnum Gardens, N.21. Registered office: 196, High Street, N.16.

Companies' Returns

Statements of Capital

Revo Electric Co., Ltd.—Capital, £500,000 in ordinary shares of 10s. each. Return dated July 30th. 735,000 shares taken up. £228,150 paid. £139,350 considered as paid. Mortgages and charges: Nil.

Chloride Electrical Storage Co., Ltd.—Capital, £1,250,000 in 62,000 6 per cent. preference stock,

£791,100 "A" ordinary stock, £297,603 "B" ordinary stock, and 99,297 unissued shares of £1 each. Return dated July 30th. All preference stock and "A" and "B" ordinary stock taken up. £207,200 paid. £943,503 considered as paid. Mortgages and charges: Nil.

Reason Manufacturing Co., Ltd.—Capital, £52,500 in 200,000 preference and 10,000 ordinary shares of 5s. each. Return dated August 14th. 161,260 preference and 10,000 ordinary shares taken up. £19,644 5s. paid on 78,657 preference. £23,150 15s. considered as paid on 82,603 preference and 10,000 ordinary. Mortgages and charges: £20,000.

Electric Construction Co., Ltd.—Capital, £400,000 in 100,000 preference and 300,000 ordinary shares of £1. Return dated August 5th. All shares taken up. £153,710 paid on 73,710 preference and 80,000 ordinary shares. £246,290 considered as paid on the remainder. Mortgages and charges: £112,960.

Isle of Arran Electric Light & Power Co., Ltd.—Capital, £20,000 in 19,000 ordinary and 1,000 preference shares of £1. Return dated August 8th. 17,700 ordinary and 1,000 preference shares taken up. £17,500 paid on 17,500 ordinary shares. £1,200 considered as paid on 1,000 preference and 200 ordinary shares. Mortgages and charges : Nil.

South London Electric Supply Corporation, Ltd.—Capital, £750,000 in 50,000 6 per cent. cumulative preference and 700,000 ordinary shares of £1 each. Return dated April 1st (filed August 1st). 30,000 preference and 533,520 ordinary shares taken up. £290,000 paid. £273,520 considered as paid. Mortgages and charges: £300,000.

Shoreham & District Electric Lighting & Power Co., Ltd.—Capital, £200,000 in 200,000 ordinary shares of £1 each. Return dated August 4th. 140,000 shares taken up. £133,500 paid. £6,500 considered as paid. Mortgages and charges: Nil.

A. W. Penrose & Co., Ltd.—Capital, £45,000 in 30,000 ordinary 10,000 first preference and 5,000 second preference shares of £1 each. Return dated August 1st. 40,500 shares taken up. £10,507 paid. £29,993 considered as paid. Mortgages and charges: Nil.

Kalgoorlie Electric Power and Lighting Corporation, Ltd.—Capital, £200,000 in 400,000 shares of 10s. each. Return dated July 31st. 375,000 shares taken up. £137,498 10s. paid. £50,001 10s. considered as paid. Mortgages and charges: Nil.

Northwood Electric Light and Power Co., Ltd.—Capital, £290,000 in 6,880 cumulative preference and 283,120 ordinary shares of £1 each. Return dated July 30th. 6,880 preference and 279,680 ordinary shares taken up. £215,775 paid. £70,785 considered as paid. Mortgages and charges: Nil.

Anchor Insulating Co., Ltd.—Capital, £6,000 in £1 shares. Return dated August 14th. 5,277 shares taken up. £837 paid. £4,400 considered as paid. Mortgages and charges: Nil.

British Electric Meters, Ltd.—Capital, £50,000 in £1 shares. Return dated August 5th. 35,600 shares taken up. £28,250 paid. £7,350 considered as paid. Mortgages and charges : Nil.

Geo. Bray & Co., Ltd.—Capital, £160,000 in 80,000 preference and 80,000 ordinary shares of £1 each. Return dated August 5th. 55,000 preference and 55,000 ordinary shares taken up. £7 paid. £109,993 considered as paid. Mortgages and charges: £40,000.

National Electric Construction Co., Ltd.—Capital, £185,000 in 370,000 shares of 10s. each. Return dated August 7th. All shares taken up. £175,574 10s. paid. £9,425 10s. considered as paid. Mortgages and charges: Nil.

Anchor Cable Co., Ltd.—Capital, £250,000 in 25,000 shares of £10 each. Return dated August 8th. 21,334 shares taken up. £79,340 paid. £134,000 considered as paid. Mortgages and charges : Nil.

Increases of Capital

Gibson Todd & Co., Ltd.—The nominal capital has been increased by the addition of £1,000, in £1 ordinary shares, beyond the registered capital of £1,000.

Birmingham Home and Office Telephone Co., Ltd.—The nominal capital has been increased by the addition of £1,000, in £1 shares, beyond the registered capital of £1,000.

Mortgages and Charges

British Mechanical Productions, Ltd.—Debenture charged on freehold property at Wandsworth, S.W., and the company's undertaking and property, present and future, including uncalled capital, but excluding ten life insurance policies, dated October 17th, 1941, to secure all moneys due or to become due from the company to Lloyds Bank, Ltd.

Kelvin Norton Electric Co., Ltd.—Equitable charge on contract or order moneys, dated October 22nd, 1941, to secure all moneys due or to become due from the company to Midland Bank, Ltd.

South African Lighting Association, Ltd.—Satisfaction in full on October 6th of series of debentures dated May 27th, 1903, and registered December 24th, 1930.

Private Arrangement

W. E. Clarke, trading as "Heat and Light," 17, Hendon Way, Cricklewood.—Particulars of claims by November 18th, to Mr. A. E. Quaife, 104, High Holborn, London, W.C.1.

Bankruptcies

G. E. Holden, wireless dealer, 39, Heath Road, Twickenham.—Order made October 9th, suspending discharge for six months until April 9th, 1942.

M. Roscoe, wireless dealer, 40, London Road, Northwich.—First and final dividend of 3s. 5d. in the £ payable November 14th, at the Official Receiver's Office, 12, Lonsdale Street, Stoke-on-Trent.

Liquidations

Tabard, Ltd. — Winding up voluntarily. Liquidator, Mr. W. Y. Thompson, 16, Clapham Junction Approach, London, S.W.11.

Dulci Electrical Co., Ltd.—First and final dividend of 11.904d. in the £ payable December 1st, at 4, Broad Street, London, E.C.2.

STOCKS AND SHARES

TUESDAY EVENING.

THE general trend of Stock Exchange markets is towards higher values, although for the time being investment and speculation are inclined to await further developments from the Russian front. Gilt-edged stocks remain very firm. Central Electricity issues, for instance, are generally better, and a rise of 1½ in London & Home Counties 4½ per cent. stock has raised the price to 108. London Passenger Transport prior charges are in consistent demand. A fall in Tube Investments followed upon the declaration of a disappointing dividend, but taken as a whole, front-rank industrial shares are as difficult as ever to buy. There seems to be no pause to the flow of capital into shares of this character which pay anything between 4¼ and 4½ per cent.

Price Fluctuations

In the Home electricity group, the only change is a small improvement in Electrical Distribution of Yorkshire shares, which have risen to 41s. 3d. In the Overseas list, Tokyo Electric sixes are a further two points lower at 30½, although Japanese Government bonds happen to be in demand. East African Power strengthened to 27s. On the other hand, Perak Hydro-Electric at 18s. 9d. are 9d. down, in consequence of a fresh tax upon tin that has recently been imposed by Malaya. British Electric Traction deferred is another 10 points to the good at 885. Oriental Telephones have strengthened to 72s. 6d.

Home Railway stocks pursue a fluctuating course, the prior-charge securities being more particularly in demand. Southern 5 per cent. preference hardened to 101½. Some of the armament shares are better, Vickers being 9d. up at 17s. 6d. Strand Electrics at 3s. 6d. have gained the pence. British Aluminium at 43s. 9d. show a small decline.

South Americans

A minor boom in South American Government bonds and railway issues is an outstanding feature of the markets at the moment. This has come about by reason of the trade agreements recently announced between this country and the exporting countries of South America. So far, the shares in the industrial companies connected with the Argentine and other South American Republics have scarcely benefited, with the exception of Brazilian Tractions, in which there has been lively speculation that raised the price ¾ to 12. Anglo-Argentine Tramway stocks are, if anything, a little easier, although a definite arrangement has been announced that should settle the vexed problems in which the company is involved. Ro 5 per cent. bonds are a point higher at 92½. Southern Brazilian Electric 6½ per cents. are better at 37, and Para Electric 6 per cent. debenture is 2½ points higher at 17.

Tube Investments

A sharp fall in the price of Tube Investments ordinary shares followed the company's announcement of a dividend of 10 per cent., making 20 per cent. for the year. This compared with 23¾ per cent. which has been paid since 1938 inclusive. The announcement was quite unexpected, for the late Mr. Arthur Chamberlain, chairman of the company, gave his fellow shareholders to understand, at the meeting a year ago, that the 23¾ per cent. dividend was practically assured for some time to come. The shares have been regarded, as mentioned here, as a first-class equity investment, and the cut in the dividend came as an unpleasant reminder of what still can happen to dividends in front-rank industrial companies. From 95s. the price dropped to 86s. before it recovered a trifle. At the present quotation of 87s. 6d. the yield, on a 20 per cent. dividend basis, works out to £4 11s. 4d. per cent.

Henley's

W. T. Henley's Telegraph Works Co., Ltd., have declared the usual 5 per cent. interim dividend, serving to direct attention to the yield on the shares at the current price of 22s. 6d. The return comes to £4 9s. 0d. per cent., comparing with £4 2s. 9d. per cent. on Callender's, and £4 7s. 9d. per cent. on British Insulated. The expense of making an exchange of these investments would be too heavy for the operation to be worth while, but from the point of view of the present investor, Henley's may be regarded as relatively cheap. The company has paid 20 per cent. per annum for the past four years. The structure of the capital is worth noticing. Out of the issued capital of £1½ millions, the ordinary stock accounts for £1,300,000, the remaining £200,000 being in 4½ per cent. preference stock. This is to say that the dividend on the ordinary stock is unusually well protected when reference is made to the capital of other companies where the pre-ordinary issues are more substantial. As an industrial investment, Henley's rank deservedly high and the Stock Exchange market view is that there is little likelihood of reduction of the dividend.

Callender's

There is no need to offer any apology or excuse for the gilt-edged yield which Callender's return at the present figure, the company being so well established and financially strong, that the shares merit a high quotation, even though they may appear to be expensive. It will be recalled that some years ago Callender's reduced their dividend from 20 per cent. to the present-paid 15 per cent. The shares fell away at the time, but have been steadily rising

(*Concluded on page* 555)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend 1939-40	Dividend 1940-41	Middle Price Nov. 12	Rise or Fall	Yield p.c.
Home Electricity Companies					£ s. d.
Bournemouth and Poole	15	12½	52/6	..	4 15 5
British Power and Light	7	6	26/-	..	4 12 4
City of London	7½	7	25/9	..	5 8 9
Clyde Valley	8	8	37/6	..	4 5 4
County of London	10½	8	35/-	..	4 11 5
Edmundson's:					
7% Pref.	7	7	32/6	..	4 6 2
Ord.	6	6	28/-	..	4 5 9
Elec. Dis. Yorkshire	9	9	41/3	+6d.	4 7 3
Elec. Fin. and Securities	12½	12½	43/9	..	5 14 2
Elec. Supply Corporation	11½	10	43/9	..	4 11 4
Isle of Thanet	2	Nil	9/-	..	—
Lancs Light and Power	7½	7½	33/9	..	4 9 0
Llanelly Elec.	5½	5½	21/6	..	5 2 4
Lond. Assoc. Electric	5½	4½	18/9	..	4 16 0
London Electric	7	7	24/6	..	5 14 3
London Power Deb. Red.	5	5	104	..	4 16 2
Metropolitan	10	8	36/3	..	4 8 5
Midland Counties	8	8	37/6	..	4 5 4
Mid. Elec. Power	9	9	38/9	..	4 13 0
Newcastle Elec.	7	7	27/6	..	5 1 10
North Eastern Elec.:					
Ordinary	7	7	29/6	..	4 15 0
7% Pref.	7	7	32/6	..	4 6 2
Northampton	10	10	44/6	..	4 10 0
Notting Hill 6% Pref. (£10)	6	6	8½	..	—
Northmet Power:					
Ordinary	10	7	35/-	..	4 0 0
6% Pref.	6	6	29/6	..	4 1 4
Richmond Elec.	6	6	22/6	..	5 6 8
Scottish Power	8	8	38/3	..	4 3 4
Southern Areas	5	5	18/3	..	5 9 7
South London	7	7	23/6	..	5 19 2
West Devon	5	5	21/3	..	4 14 1
West Glos.	4½	4½	19/6	..	4 12 4
Yorkshire Elec.	8	8	39/6	..	4 1 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	3/-	+3d.	—
Calcutta Elec.	8*	7*	37/-	..	—
Cawnpore Elec.	10	10	28/9	..	6 19 0
East African Power	7	7	27/-	+1/-	5 3 8
Jerusalem Elec.	7	5	17/6	..	5 14 3
Kalgoorlie (10/-)	7½	7½	13/-	..	5 15 5
Madras Elec.	6*	4*	22/6	..	3 11 1
Montreal Power	1½	1½	25½	..	5 13 2
Palestine Elec "A"	Nil	Nil	17/6	..	—
Perak Hydro-elec.	2½	6	18/9	−9d	6 8 0
Shawinigan Power	83cts.	90cts.	16½	..	—
Tokyo Elec. 6%	6	6	30½	−2	19 13 6
Victoria Falls Power	15	15	78/9	..	3 16 2
Whitehall Inv. Pref.	7½	7½	15/-	..	10 0 0

Company	Dividend 1939-40	Dividend 1940-41	Middle Price Nov. 12	Rise or Fall	Yield p.c.
Public Boards					£ s. d.
Central Electricity:					
1950–70	5	5	110	..	4 11 1
1955–75	5	5	114	+1	4 7 9
1951–73	4½	4½	107	..	4 4 1
1963–93	3½	3½	101xd	+1	3 9 4
1974–94	3½	3½	96	+1	3 7 9
London Elec. Trans. Ltd.	2½	2½	96½	..	2 11 10
London & Home Counties 1955–75	4½	4½	108	+1½	4 3 4
Lond. Pass. Trans.:					
A	4½	4½	117½	..	3 16 8
B	5	5	116½	..	4 5 10
C	1½	3	40	..	7 10 0
West Midlands J.E.A. 1948–68	5	5	108½	..	4 12 0
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	106½	..	5 12 9
Def.	1½	1½	24½	..	6 2 5
Anglo-Portuguese	8	8	15/-	..	10 13 4
Cable & Wireless:					
5½% Pref.	5½	5½	105	+1	5 4 10
Ord.	4	4	67½	+½	5 18 5
Canadian Marconi $1	Nil	4cts.	5/-	..	3 6 0
Globe Tel. & Tel.:					
Ord.	8½*	8½*	30/-	..	—
Pref.	6	6	28/9	..	4 3 6
Great Northern Tel.:					
(£10)	20	20	14½	..	—
Inter. Tel. & Tel.	Nil	Nil	3	..	—
Marconi-Marine	7½	7½	27/6xd	+3d.	5 9 1
Oriental Tel. Ord.	11½*	16	72/6	+1/-	4 8 2
Telephone Props.	6	6	11/3	..	10 13 4
Tele. Rentals (5/-)	10	10	8/9	−3d.	5 14 3
Traction and Transport					
Anglo. Arg. Trams:					
First Pref. (£5)	Nil	Nil	2/6	..	—
4% Inc.	Nil	Nil	6½	−1	—
Brit. Elec. Traction:					
Def. Ord.	45	45	885	+10	5 1 10
Pref. Ord.	8	8	170	..	4 14 2
Bristol Trams	8*	8	42/6	..	3 15 4
Brazil Traction	$1	50c.	12	+¾	—
Calcutta Trams	8	5½	22/-xd	..	5 0 0
Cape Elec. Trams.	5	5	20/-	..	5 0 0
Lancs Transport	10	10	42/6	..	4 14 1
Mexican Light:					
1st Bonds	5	5	65	..	—
Rio 5% Bonds	5	5	92½	+1	5 8 3
Southern Rly.:					
5% Prefd.	5	5	61½	..	8 2 5
5% Pref.	5	5	101½	+1	4 18 6
T. Tilling	10	10	46/3	..	4 6 7
Tilling & B.A.	8*	7*	52/6	..	2 13 4
West Riding	10	10	39/-	..	5 2 7

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend 1939–40	Dividend 1940–41	Middle Price Nov. 12	Rise or Fall	Yield p.c. £ s. d.
Equipment and Manufacturing					
Aron Elec. Ord. ..	Nil	7½	22/–	..	6 16 4
Assoc. Elec.:					
Ord.	10	10	43/9	..	4 16 3
Pref.	8	8	38/9	+1/16	4 2 4
Automatic Tel. & El.	12½	12½	48/9	..	5 2 6
Babcock & Wilcox	11	11	45/–	..	4 17 9
British Alumimium	12½	10	43/9	–9d.	4 11 4
British Insul. Ord...	20	20	91/3	..	4 7 9
British Thermostat (5/–)	18½	18½	13/9	..	6 14 6
British Vac. Cleaner (5/–)	12½	10	12/6	..	4 0 0
Brush Ord... ..	Nil	Nil	4/6	..	—
Callender's ..	15	15	72/6	–1/16	4 2 9
Chloride Elec. Storage	15	15	70/–	..	4 5 9
Consolidated Signal	17	17	75/–	..	4 10 10
Crabtree (10/–) ..	17½	17½	28/3	–6d.	6 4 0
Crompton Parkinson Ord. (5/–) ..	30	20	20/–	..	5 0 0
E. K. Cole (5/–) ..	10	Nil	9/–	..	—
E.M.I. (10/–) ..	Nil	6	13/3	..	4 10 7
Electric Construction	10½	10	32/6	..	6 3 0
Enfield Cable Ord.	16½	12½	53/9	..	4 13 0
Elecl. Switchgear (10/–)	16	10	20/–	..	5 0 0
English Electric ..	10	10	36/3	..	5 10 4
Ensign Lamps (5/–)	25	25	16/3	..	7 13 10
Ericsson Tel. (5/–)	25*	22*	40/–	..	2 15 0
Ever Ready (5/–) ..	40	40	29/3xd	+4½d.	6 16 6
Falk Stadelmann ..	7	7½	17/6	..	8 11 6
Ferranti Pref. ..	7	7	26/3	..	5 6 10
G.E.C.:					
Pref.	6½	6½	32/6	..	4 0 0
Ord	20	17½	77/6	..	4 10 2
Greenwood & Batley	15	13	25/–	..	10 8 0
Hall Telephone (10/–)	15	10	15/–	..	6 13 4
Henley's (5/–) ..	20	20	22/6	..	4 9 1
4½% Pref. ..	4½	4½	21/3	..	4 4 8
Hopkinsons ..	15	15	45/–	..	6 13 4
India-Rubber Pref.	5½	5½	21/3	..	5 3 6
Intl. Combustion ..	32½	30	105/–	..	5 14 3
J. Lucas	15	15	60/–	..	5 0 0
Johnson & Phillips	15	15	55/–	..	5 9 1
Lancashire Dynamo	20	20	62/6	..	6 8 0
Laurence, Scott (5/–)	15	15	11/–	..	6 16 4
London Elec. Wire	7½	7½	25/–	..	6 0 0
Mather & Platt ..	13½	10	42/6	..	4 14 1
Metropolitan Elec. Cable Pref. ..	5½	5½	21/3	..	5 3 6
Murex	20	20	91/3	+1/16	4 7 9
Pye Deferred (5/–)..	25	25	13/9	..	9 1 10
Revo (10/–) ..	5	20	25/–	..	8 0 0
Reyrolle	12½	12½	56/3	..	4 9 0
Siemens Ord. ..	7½	7½	25/–	..	6 0 0
Strand Elec. (5/–)..	4	2	3/6	+6d.	2 17 1
S. Smith (4/–) ..	37½	50	7/–	..	7 2 10
Switchgear & Cowans (5/–) ..	10	15	10/–	..	7 10 0
Tel. Condenser (10/–)	Nil	5	11/3	..	4 9 0
T.C. & M.	10	10	41/3	..	4 17 0
Telephone Mfg. (5/–)	9	9	8/3	..	5 9 1
Tube Investments .	23¾	20	87/6	–5/–	4 11 4
Vactric (5/–) ..	4	Nil	3/6	..	—
Vickers (10/–) ..	10	10	17/6	+9d.	5 14 5
Ward & Goldstone (5/–)	20	20	17/6	..	5 14 3
Westinghouse Brake	17½	10	47/6	..	4 4 4
Walsall Conduits (4/–)	55	55	31/3	..	7 0 9
West, Allen (5/–) ..	7½	[7½	5/–	..	7 10 0

* Dividends are paid free of Income Tax.

Stocks and Shares (*Concluded from page* 553)

since then. From this it may be inferred that expectation looks for a restoration of the previous 20 per cent. dividend sooner or later. Were it not for some such expectation, Callender's might be deemed overvalued, but with the possibility—perhaps post-war—of a return to 20 per cent. dividend, the price of the shares is held more in relation to the latter rate than to the 15 per cent. distribution which is now made. At 72s. 6d. the price has shed the 1/16 which it gained last week.

Radio Shares

During the past week or so a good deal of interest has been taken in shares of companies normally dealing with radio and kindred business. Among these Shares the movement seems to have been started by the rise in Electric & Musical Industries shares—"Emmies," for short. The improvement in these shares sent inquiries into the market for E. K. Cole, Cossor, Pye, etc. E.M.I. shares hold their rise to 13s. 3d., for which there was some foundation in the declaration by the company of a 6 per cent. dividend, against nothing in the previous year. More recently, E. K. Cole have come to the front, the price being 1s. up at 9s. They are 5s. shares, and the year ends in March. No dividend was paid in respect of the previous twelvemonth. Pye deferred also are 5s. shares and at 13s. 9d. the yield on the money, on the basis of the last-paid 25 per cent. dividend, comes to a little over 9 per cent. A.C. Cossor 5s. shares last received 15 per cent. dividend and stand at 8s. It is difficult to draw comparisons between the shares of companies engaged in this particular line of business, but, on the face of it, Pye deferred look cheap by comparison with E. K. Cole shares.

The Investor's Intention

Post-war prospects nowadays count more than the profits which a company is making under war conditions. The investor assiduously applies his attention and his capital to the search for shares in such companies as may be expected, with a reasonable amount of assurance, to expand materially, encouraged by the lessened burden of taxation that everyone devoutly hopes for. It will be noticed that the ordinary shares of the Home electricity supply companies give, on an average, rather less than 4½ per cent. on the money.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1939

20503. "Double acting wind turbines." J. A. Johanson. July 14th, 1939. (540402.)

25762. "High-speed telegraph systems." A. Carpmael. (Amalgamated Wireless (Australasia), Ltd.). September 13th, 1939. (Convention date not granted.) (540482.)

27547. "Means for taking stereoscopic X-ray photographs." L. Mellersh-Jackson. (Powers X-ray Products, Inc.). January 9th, 1940. (540403.)

1940

2925. "Modulated carrier-wave transmitters." Marconi's Wireless Telegraph Co., Ltd. (Amalgamated Wireless (Australasia), Ltd.). February 15th, 1940. (Convention date not granted.) (540371.)

3924. "Apparatus for electrically precipitating suspended particles from gases." American Air Filter Co., Inc. April 13th, 1939. (540448.)

6400. "Method of manufacturing composite lead powder for the electrodes of storage batteries." S. Isaki. April 9th, 1940. (540330.)

6411. "Lampholders, and switch devices therefor." Ceag, Ltd., and R. J. Plummer. April 9th, 1940. (540331.)

6564. "Electrical contact lugs." Cinch Manufacturing Corporation. May 3rd, 1939. (540377.)

6642. "Electrical regulating apparatus." Westinghouse Brake & Signal Co., Ltd. October 6th, 1939. (540379.)

6716. "Control of single-phase commutator motors." British Thomson-Houston Co., Ltd., and A. H. Maggs. April 13th, 1940. (540385.)

6732. "Liquid-flow indicator." Light Production Co., Ltd., and P. J. Hutchings. April 13th, 1940. (540417.)

6846. "Means for saving life." General Electric Co., Ltd., C. P. Harrison and C. W. Saunders. April 16th, 1940. (540336.)

6847. "Machines for bending metal strip, rod or the like." Standard Telephones & Cables, Ltd., and F. W. May. April 16th, 1940. (540452.)

6849. "Mechanism for the transmission of power." Sulzer Frères Soc. Anon. April 21st, 1939. (540453.)

6850. "Automatic gain-control system." Philco Radio & Television Corpn. May 24th, 1939. (540454.)

6900. "Self-regulating electric transformers." A. Walters & Son, Ltd., and H. Muller. April 17th, 1940. (540456.)

6907. "Use of high-frequency electric fields for heating." British United Shoe Machinery Co., Ltd. (United Shoe Machinery Corporation.) April 17th, 1940. (540494.)

6924. "Electric valve amplifiers having a power stage." General Electric Co., Ltd., D. M. Heller and E. M. Leyton. April 17th, 1940. (540457.)

6936/6937. "Compressors, blowers or the like." Broom & Wade, Ltd., and H. S. Broom. April 17th, 1940. (540497/540498.)

6947. "Alternating-current generators." Brush Electrical Engineering Co., Ltd., and J. H. R. Nixon. April 17th, 1940. (540499.)

7004. "Dynamo-electric machines." British Thomson-Houston Co., Ltd., and B. Adkins. April 18th, 1940. (540337.)

7233. "Auxiliary switches for electro-magnetic contactors and the like." Igranic Electric Co., Ltd. June 9th, 1939. (540338.)

7652. "Composite metal articles and a method of producing same." London Electric Wire Co. & Smiths, Ltd., and A. B. Ashton. April 29th, 1940. (540423.)

7670. "Apparatus for feeding light fragile articles." British Thomson-Houston Co., Ltd. April 27th, 1939. (540501.)

7671. "Conveyors." British Thomson-Houston Co., Ltd. April 27th, 1939. (540424.)

8648. "Anti-dazzle devices for lamps." Notek Electric Co., Ltd., and R. P. H. Hinds. May 14th, 1940. (Cognate application, 11431/40.) (540340.)

10525. "Electrically heated bench soldering iron." J. H. White. June 18th, 1940. (540394.)

10537. "Automatic control of air-conditioning plants." Climator, Ltd., and M. Berlowitz. June 18th, 1940. (540428.)

10621. "Aircraft speed and drift indicating systems." Electrical Research Products, Inc. June 24th, 1939. (540505.)

11048. "Temperature responsive devices employing electric resistances." British Thomson-Houston Co., Ltd. June 29th, 1939. (540344.)

11402. "Electrical precipitation of suspended particles from a stream of gas." Lodge-Cottrell, Ltd. (International Precipitation Co., Inc.) July 8th, 1940. (540508.)

11533. "Fluid-pressure-responsive electric switches. Vickers, Inc. July 13th, 1939. (540471.)

11566. "Insulated holders and associated electric contacts for detachable elements such as fuses." Aero Engines, Ltd., and P. Sykes. July 11th, 1940. (540398.)

12273. "Thermostatic switch arrangements." Coldair, Ltd., and E. J. Wray. July 29th, 1940. (540431.)

12293. "Electric remote indication devices." British Thomson-Houston Co., Ltd. July 29th, 1939. (540399.)

12467. "Circuit arrangements embodying electron-discharge devices." British Thomson-Houston Co., Ltd. August 1st, 1939. (540400.)

13050. "Systems for the automatic control of conditions, such as temperature and pressure, in electrically heated apparatus." British Thomson-Houston Co., Ltd. August 18th, 1939. (540401.)

13749. "Electric circuit-breakers of the gas-blast type." British Thomson-Houston Co., Ltd. September 1st, 1939. (540349.)

14382. "Electrical systems for remote control and supervision." General Electric Co., Ltd., and H. E. Bartlett. September 20th, 1940. (540353.)

14674. "Electrical apparatus of the eddy current type." M. P. Winther. May 4th, 1940. (540354.)

14845 "Electric lamp sockets." British Thomson-Houston Co., Ltd. October 3rd, 1939. (540355.)

14846. "Sockets for tubular lamps or the like." British Thomson-Houston Co., Ltd. October 3rd, 1939. (540356.)

15530. "Electric timing devices." British Thomson-Houston Co., Ltd. October 21st, 1939. (540478.)

16565. "Installation of switches in wall boxes." J. H. Tucker & Co., Ltd., and F. C. Fuke. Nov. 16th, 1940. (Addition to 530225.) (540359.)

16915. "Electro-magnetic induction apparatus." British Thomson-Houston Co., Ltd. November 24th, 1939. (540434.)

17376. "Electro-deposition of metals." Mallory Metallurgical Products, Ltd. December 19th, 1939. (540437.)

1941

6816. "Two-part electric couplings." British Thomson-Houston Co., Ltd., L. Hubble and E. R. Edinborough. April 10th, 1940. (Divided out of 537357.) (540361.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—SYDNEY COUNTY COUNCIL.—November 27th. Two 30,000-kVA transformers for Bunnerong. Specification 544.

December 18th. High- and low-voltage cables for the Bunnerong power station. Specification 560.

January 29th. Steam and feed water piping for No. 10 turbo alternator for the Bunnerong power station. Specification 559.

Belfast.—November 24th. Electricity Department. Arc rectifier, AC motors and wiring, 6.6-kV switchgear, 33-kV cables and static transformer. (October 31st.)

Birkenhead. — November 17th. Electricity Department. Stores for six months commencing January 1st, 1942. (October 31st.)

Sleaford.—November 17th. Electricity Department. 150-kVA, three-phase transformer. (October 24th.)

South Africa.—POST OFFICE.—December 4th. Equipment for radio-telephone link between Maseru and Mokhotlong. (October 24th.)

DURBAN.—November 28th. City Council. Tap-changing transformer, etc. January 16th, 1942. Potential and current transformers. Contract E. 2038.

JOHANNESBURG.—City Council. December 27th. Low-voltage metal-clad switchboards. Contract 883. Oil-immersed circuit-breakers. Contract 884.

Orders Placed

Bradford.—Electricity Committee. Accepted. Fire fighting equipment.—Mather & Platt, Ltd.

Glasgow.—Transport Committee. Accepted. Electric canteen equipment. English Electric Co., Ltd.

Huddersfield.—Electricity Department. Accepted. Cables—British Insulated Cables, Ltd., and Callender's Cable and Construction Co., Ltd. Stoneware conduit.—Doulton & Co., Ltd.

Manchester.—Electricity Committee. Accepted. Cable.—Scottish Cables, Ltd. Induced draught fan impeller and shaft, etc.—J. Howden & Co. (Land), Ltd. Busbar protective gear.—Ferguson, Pailin, Ltd. Cooker boiling plates.—Simplex Electric, Ltd. Water heaters.—George Bray & Co., Ltd.—AC substation switchgear.—Contracts with Bertram Thomas (Engineers), Ltd., and Parmiter, Hope & Sugden, Ltd., extended for twelve months.

Middlesbrough.—Town Council. Accepted. Cable for the Poole Sanatorium X-ray plant (£231).—Britannic Electric Cable & Construction Co., Ltd.

Sheffield.—Electricity Committee. Accepted. Plant protective works at Neepsend (£2,565) and Blackburn Meadows (£5,100).—Mitchell Engineering, Ltd.

South Africa.—DURBAN.—City Council. Accepted. 2,500 gas-filled, Edison-screw cap, clear-glass 220-V, 200-W lamps.—Siemens Bros. & Co. (British), Ltd. 15,000 gas-filled, bayonet-cap, pearl, 220-V, 75-W lamps and 1,500 200-W clear-glass ditto.—William Trevor Williams (Pty.), Ltd. One hundred outdoor type, fully enclosed 7,500-V, 50-A fuse cut-outs with mounting brackets and fuses.—South African General Electric Co., Ltd. Thirty-six 3,300-V, 200-A, 25-MVA rupturing capacity single-phase oil circuit-breakers.—P. J. Yelland & Co. (Pty.), Ltd.

Wallasey.—Electricity Committee. Accepted. Transformer and switchgear (£799).—English Electric Co., Ltd.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Ashbourne.—Deep air-raid shelters with electric lighting; D. Powell, surveyor, Council Offices, Compton Street.

Blackburn.—Communal feeding centre; W. Pickstone, borough engineer, Town Hall.

Boldon Colliery (Co. Durham).—Restaurants at Whitburn Colliery and Whitburn Village; N. Hindmarsh, U.D.C. architect.

Bradford.—Shelters, strengthening of school basements and installation of lighting and heating (£46,900); Education Committee.

Brampton Bierlow.—Canteen; H. Fawcett, manager, Brampton Bierlow Colliery, Wombwell, near Barnsley.

Brighouse.—Electric power installation at refuse disposal works; H. A. Sneezum, borough engineer, Municipal Buildings.

Chesterfield.—Mortuary; J. Harrison, county architect, County Offices, St. Mary's Gate, Derby.

Corbridge.—Additions to maternity hospital for the Northumberland Nursing Association, Kings Avenue, Morpeth.

Coventry.—Central library; D. E. E. Gibson, city architect, 1a, Warwick Row, Coventry.

Cramlington (Northumberland).—Canteens at three more collieries; Mr. Appleby, engineer, Mining Offices, Cramlington.

Darlaston.—School, Salisbury Street, for Staffordshire Education Committee; K. L. Murray, county architect, County Buildings, Stafford.

Dukinfield.—Seven communal cooking depots; E. N. Stannion, borough surveyor, Town Hall.

Durham.—Emergency cooking depots; F. Willey, 34, Old Elvet, Durham City.

Gosforth (Newcastle-on-Tyne).—British Restaurant; Clifford Wyld, U.D.C. Offices, Gosforth, Newcastle.

Hemsworth.—British Restaurants at South Elmsall, South Kirby, Great Houghton, Grimethorpe, South Hiendley, Ryhill, and Ackworth (£4,415), for R.D.C.; S. Price, surveyor, Market Chambers, Hemsworth, near Pontefract.

Hendon.—Additions; A. H. Horrocks & Sons, Ltd.

Hornchurch.—Cleansing stations for U.D.C.; D. E. Hart, surveyor, Council Offices, Billet Lane, Hornchurch.

Huddersfield.—Erection of nursery at Princess Royal Maternity Home; borough engineer, High Street Buildings.

Hyde.—Feeding centres at elementary schools; J. H. Ward, borough surveyor, Town Hall.

Lancashire.—Installation of electricity in all school shelters and air-raid shelters at five school clinics; A. Evans, county architect, County Offices, Preston.

Schools at Maghull and Knowsley; A. Evans, county architect, County Offices, Preston.

Lees (near Oldham).—Canteen and nursery; Owl Mill Spinning Co. (1920), Ltd.

Leominster.—Kitchen and stores at Church Institute (£1,500); Herefordshire county architect, County Offices, Bath Street, Hereford.

Lichfield.—Church, Pheasey estate; Captain E. C. Lavender, architect, Waterloo Chambers, Waterloo Street, Wolverhampton.

London.—CAMBERWELL.—Wartime nursery at Staffordshire Street (£1,025); borough engineer.

Long Eaton.—Youth centre (£3,600); Derbyshire Education Committee.

Manchester.—Alterations to soap works; T. Hedley & Sons, Ltd., Phœnix Buildings, Newcastle-on-Tyne.

Middlesbrough.—Erection of brick shelters, including electric lighting, at schools (£20,000). Contractors: Hudson Bros.; Stephen Coates, Ltd.; W. A. King & Sons; J. McCreton, Ltd.. N. Thompson, Ltd.; W. E. Price; and C. J; Boyd, Ltd. (all of Middlesbrough).

Middlesex.—Canteen, Orleans School, Gleanings (£1,210), and alterations for canteen, Cowley Road School, Uxbridge; county architect, Middlesex House, Vauxhall Bridge Road, S.W.1.

Middlewich.—Wiring Town Hall; M. W. Sowden, surveyor, Town Hall.

Netherton (Northumberland).—Canteens at two collieries; Netherton Colliery Co.

Northamptonshire.—Nursery centres, Corby, Rushden and Wellingborough; county architect, County Hall, Northampton.

Prudhoe (Northumberland).—British Restaurant; U.D.C. architect.

Sedgley.—Adapting schools as feeding centres, Lower and Upper Gornal (£1,840), and provision of dining centre at Dormston Girls' School; surveyor, Council Offices, High Holborn, Sedgley.

Sheffield.—Canteen, Hartshead (£3,000); transport manager.

Shropshire.—School canteens (£7,678); county architect.

Smethwick.—Cleansing station (£2,400); borough engineer.

Southend-on-Sea.—Restaurant, Hinguar Street Schools, Shoeburyness; R. G. Baxter, borough engineer, Municipal Buildings.

Spennymoor (Co. Durham).—Two community feeding centres; W. B. Marley, surveyor, U.D.C. Offices, Spennymoor.

Stanley (Co. Durham).—Houses; U.D.C. surveyor.

Stoke-on-Trent.—Additions to Etruria pottery works; Hartleys (Stoke-on-Trent), Ltd., Kearsley Chambers.

Rest and feeding facilities at Booth Street (£1,300), and additional school shelters (£4,620); A. Burton, city engineer, Town Hall.

Stourbridge.—Two British Restaurants at Lye and Stourbridge; Bridgewater Bros., builders, Corngreaves House, Cradley, near Dudley.

Stretford.—Feeding centre, Hale; Smith & Allcock.

Fire station, Trafford Road; Mr. Seward, architect.

Stroud.—Three British Restaurants, and nursery at Stratford Park House; surveyor, Urban Council Offices, Stroud, Glos.

Sunderland.—Boilerhouse, Durham Road for Mayfair Dairies; W. & T. R. Milburn, architects, 17, Fawcett Street, Sunderland.

Alterations in Lower Dundas Street for Smith & Stephenson, Ltd.

Whitley Bay.—Workshops, Hill Heads Road; W. Williams & Co., Ltd.

Winsford.—Extensions to central fire station; P. Heaton, surveyor, Council Offices, Winsford, Cheshire.

Woodlands (Yorks.).—Canteen; L. A. Clarke, manager, Brodsworth Colliery, Woodlands, Doncaster.

Worthing.—Furniture depository, Tarring Road for F. W. Shaw & Sons; Goldsmith & Pennells, architects.

Extensions, Oaklands Farm Dairy, Elm Grove, for Oaklands Farm Dairy, Ltd.; Clayton & Black.

Additions, Dominion Laundry, Dominion Road, for West Worthing Laundries, Ltd.; H. J. Paris, Ltd.